



FEASIBILITY STUDY OF CROSS-BORDER E-CMR IN THE BALTIC-NORDIC REGION

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The current Feasibility Analysis has been compiled within the “DIGIINNO – Digital Innovation Network” project WorkPackage 3 “Digitalization of cross-border government to business (G2B) public services”.

The report covers important elements to possible Baltic-Nordic regional eCMR service, and its main suggestions are based on the work of the workpackage partners. The current report was completed based on the available information for the author during the period of the study (June-August 2019), amended by WorkGroup members in September 2019 and does not necessarily declare to be exhaustive on all conditions and recommendations.

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Introduction

This feasibility analysis has been conducted in 2019 within the framework of Baltic-Nordic cooperation DIGINNO project¹, ran between 2017-2020. The overall goal of DIGINNO project is to advance the digital economy, focusing on developing innovative digital cross-border public services and to speed up the process of moving towards the digital single market, Baltic Sea Region (BSR).

The DIGINNO project partners in Work Package 3 *inter alia* concentrated on the digital transport information matters. After deciding that there is a great potential and need in digitization of cross-border logistics, the road transport CMR Consignment note was chosen as a focus to analyze the feasibility of its digitalizing. Experts and stakeholders working on in similar developments either nationally or on EU level were engaged to discussions through October 2018 to April 2019.

The current feasibility analysis is delivered to evaluate the implementation of e-CMR in the Baltic-Nordic region, considering mainly the cross-border aspects in the DIGINNO project partners countries (Denmark, Estonia, Latvia, Lithuania, Norway, and Poland).

The purpose of this analysis is to review the current situation and make recommendations on the digitalization of the cross-border electronic consignment notes (CMR), evaluating the relevant technical, legal, institutional, economic and other aspects mainly in the project countries.

The analysis reviews the current state of affairs, that create the environment for the implementation of the electronic CMR Consignment Note in electronic format based on the "Additional Protocol to the Convention on the contract for the international carriage of goods by road (CMR) concerning the electronic Consignment note".

The Digilnno project and the analysis is supporting the creation of electronic CMR document/data exchange pilot service between Baltic Sea region's countries. The analysis supports the further outlook that eCMR would be legally accepted and used by each participating country in the Baltic Sea Region. So that each participating country would legally accept its data exchange, signing and storage policies. It is expected that private logistics companies (carriers, receivers, brokers, etc.) and governmental organizations would have tools to access e-CMR documents/data and accept them as paper analogues.

The definition

The CMR Consignment Note² serves both as an evidential document (at a civil level) and a control document (at an administrative level) of international carriage of goods. It serves as a proof of the contract of carriage and as proof of the handling of the goods by the carrier. In all countries of the Convention, the CMR consignment note is a control document which must be in the vehicle whilst carrying goods, because it will be requested in the case of a control (IRU, 2017)³.

E-CMR is digitalized CMR created according to Additional Protocol to the original Convention⁴ and has already been installed in some European Union countries (i.e. Spain, France, United Kingdom, Denmark, Estonia among others). Although the Convention might be ratified, unfortunately the

¹ DIGIINNO. Baltic Sea Region project DIGIINNO (Digital Innovation Network), <https://www.diginnoobsr.eu/about>

² UN. Convention on the Contract for the International Carriage of Goods by Road (CMR) (1978 - Geneva, 19 May 1956 as amended by Protocol to the CMR, Geneva, 5 July 1978)

https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XI-B-11&chapter=11&clang=en and https://treaties.un.org/doc/Treaties/1978/07/19780705%2007-38%20PM/CTC_XI-B-11-a.pdf

³ IRU. <https://www.iru.org/sites/default/files/2017-03/cmr-faq-en.pdf>

⁴ Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road (CMR) Concerning the Electronic Consignment Note, <https://www.unece.org/fileadmin/DAM/trans/conventn/e-CMRRe.pdf>

countries do not necessarily have any agreements and/or policies in order to make e-CMR documents exchange fully applicable.

The EU perspective on the topic

At the European Union (EU) level, it is an evident contribution of the EU freight transport logistics sector to the EU economy, mainly in the form of jobs created and the added value by the sector. In the EU, the transport and storage sector employ around 11 million persons, accounting for more than 5% of total employment and almost 5% of GDP⁵. Despite that, the road transport sector is still lagging in using digital means in comparison to other sectors of our society and economy. Most freight transport operations in the EU still require the use of paper Consignment note, leading to the situation that an international truck driver still needs to carry with him in the cabin a respective amount of paper hardcopies. The slow uptake of digitization has been side-storied with inefficiencies for market players in the transport and logistics chains, in cross-border transport, and an unnecessary environmental burden. According to the Impact Assessment⁶ prepared by the DG MOVE supporting the upcoming legislation, in recent years, almost 99% of all cross-border transport operations in the EU still involve paper-based Consignment note at one or another stage of the operation.

Furthermore, slow uptake of digitization complicates the enforcement of the rules by national authorities, since the checks need to take place where the paper copies are. Given the fact that total freight transport movements are expected to grow by more than 50% up to 2050, the slow uptake of digitalization will become an even severe issue in the coming years. Following this, European Transport Commissioner stressed on 22 March 2017 that digitalization would be vital to the success and survival of transport and logistics companies, even if many of their processes today were still manual. Also, the European Parliament has been calling several times in the past for a stronger push towards paperless and urged for a more simplified, paperless, seamless, transparent, secured and trusted information flow between businesses, customers and authorities.

The European Commission supports the recognition of electronic Consignment note implementation for freight carriage. An electronic Consignment note is promoted in the communication on a Digital Single Market strategy for Europe (May 2015)⁷ announced by the European Commission as initiative offering new opportunities for transport and other sectors. In a broader context, the Commission is working on the digitalization of transport documents for all modes and the promotion of their acceptance by public authorities. The European Commission presents such commitment at the EU eGovernment action plan, which is announced for the period 2016-2020 (COM(2016)179 final). The ICT Standardization Priorities are also presented at the document for the Digital Single Market (COM(2016)176), where the need of common ICT standards ensuring the interoperability of digital technologies and the foundation of an effective Digital Single Market is declared.

At the time being, the preparations towards a EU Regulation are ongoing to promote and implement the acceptance of digital reporting of transport-related data by all EU public authorities. For that,

⁵ European Commission (2018). Transport in the European Union: Current Trends and Issues.

<https://ec.europa.eu/transport/sites/transport/files/2018-transport-in-the-eu-current-trends-and-issues.pdf>

⁶ European Commission (2018). Commission Staff Working Document, Impact Assessment, Accompanying the document, Proposal for a Regulation of the European Parliament and of the Council on electronic freight transport information SWD/2018/183 final - 2018/0140 (COD);

⁷ European Commission (2015). Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions: A Digital Single Market Strategy for Europe, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A52015DC0192;>

the European Commission has issued a Proposal for the eFTI Regulation⁸ and currently (2019), the negotiations are taking place among the institutions. The Digital Transport and Logistics Forum, DTLF⁹, is the main contributor to working out solutions for the period after the implementation.

Main problems hindering the usage of e-CMR

A number of corporate transport management and data exchange systems are implemented by major transport operators, these systems may also provide cross-border services. Very rarely, though, can be considered e-CMR services. Those databases and data exchange mechanisms are also not recognized as reliable CMR data source by public authorities. Also, the hindrance is that in most cases, the information provided is not compatible with the public data systems or information submission requirements, which would allow access by for instance traffic police or custom officers.

Non-acceptance by other countries' authorities is a barrier hampering the use of electronic documents. In addition, there is a certain gap in understanding, which type of data is accompanying the CMR.

Several problems are also identified on the EU level, which are linked with electronic Consignment note implementation:

- a) Acceptance of cross-border e-CMR by the Member States and their authorities (the ratification of the Additional Protocol of the CMR convention);
- b) The lack of generally applicable mandatory rules on cross-border e-CMR data and accompanying documents;
- c) The development of limited or country-specific models which are linked with international standards for cross-border e-CMR implementation resulting from the lack of common approach to e-CMR services;
- d) Growing, but still low amount of evidence on the acceptance of electronic transport documents by courts and on the enforceability of the contracts of carriage concluded or evidenced in an electronic form;
- e) The lack of legal certainty of electronic format to external partners and participants, such as decisions of banks and insurance companies to accept electronic transport documents;
- f) Reluctance or hesitance of supply chain participants to use e-CMR for the transport services.

Changes in those approaches would foster an electronic exchange of information along with the EU transport and logistic parties, especially regarding cross-border transport operations, having their origin, destination or transiting in the EU Member State's territory. Transport operations could follow information requirements enabling the use of electronic means for transmission of regulatory information on cargo transport to the authorities not just at the point of entry and exit of the EU, but also on the entire EU territory, as well as the Baltic-Nordic region as one coherent and digitally developed region of EU. All necessary of documentation and data is possible to be collected, forwarded, exchanged and archived in electronic format, as well as e-CMR as a complex. There is no legal obligation to use e-CMR imposed on supply chain or transport partners, but the level of knowledge of the effects as well as regulatory outlook of cross-border e-CMR could be higher.

⁸ Proposal for a Regulation of the European Parliament and of the Council on electronic freight transport information COM/2018/279 final – 2018/014/COD, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018PC0279>

⁹ Digital Transport and Logistics Forum, www.dtlf.eu

1. Study methodology

The main aim of the study is to identify the critical design milestones within the context of cross-border e-CMR implementation in the Baltic-Nordic region. Further on this implementation, milestones could be successfully achieved in prototyping cross-border e-CMR.

The study focused on the cross-border CMR in a digital working environment and try to generate its application ideas. The study invites stakeholders to reveal daily CMR use cases, examples, or national studies to share and encourage a discussion in the international landscape.

In order to understand the whole challenge of switching from cross-border CMR to the cross-border e-CMR stage, the elements analysis framework is used. It was asked by stakeholders to identify, how the implementation of electronic Consignment implementation approaches might affect it in terms of work added (e.g. more computer monitoring work, etc.) and work removed (e.g. manual work removed, jobs eliminated). Therein, the digitalization of each element of the Consignment note could mean a new way of working.

The study covered such types of institutions:

- National Governmental organizations, Industry, Relevant actors in ICT;
- International Organizations, EU Agencies, Other relevant stakeholders.

Seeking to evaluate what are the potential and real obstacles to achieving the goal, SWOT analysis is delivered, which is referring to the answers from project partners.

All types of institutions were asked to contribute to the questionnaire received. The questionnaire examined the legal, technical and process interoperability and the status of the development and implementation of cross-border Electronic Consignment (e-CMR). The questionnaire focused on recent progress in the field of cross-border e-CMR digitalization taking into consideration regulatory output as well. In general, the questionnaire had questions concerning issues as follows:

- Clarification of Main players and their interest;
- The aspect of the 3PL process in countries;
- Standards developed in countries;
- Main risks and opportunities.

Each project partner delivered responses to the questionnaire from National governments; Technology providers; National associations; Corporates.

In order to attract maximum attention to this study goals, the stakeholder's engagement plan is considered by:

- Listing potential stakeholders;
- Identifying their interest and role;
- Constructing stakeholders and roles matrix.

International freight delivery transactions involve the number of activities performed by several different supply chain parties. The role of different parties depends on the terms of business, type of product, country, market, and the methods of operations committed by buyers and sellers. Therein the monitoring and controlling level must be added as requested by institutions. All these aspects will be validated with the frame of the International Supply Chain Reference Model.

The legal analysis will be performed by identification of gaps in legislation that allow the acceptance of freight documents in electronic form. The revision examines if countries have ratified e-CMR protocol, and implemented e-signature regulation, and adopted national legislation concerning e-

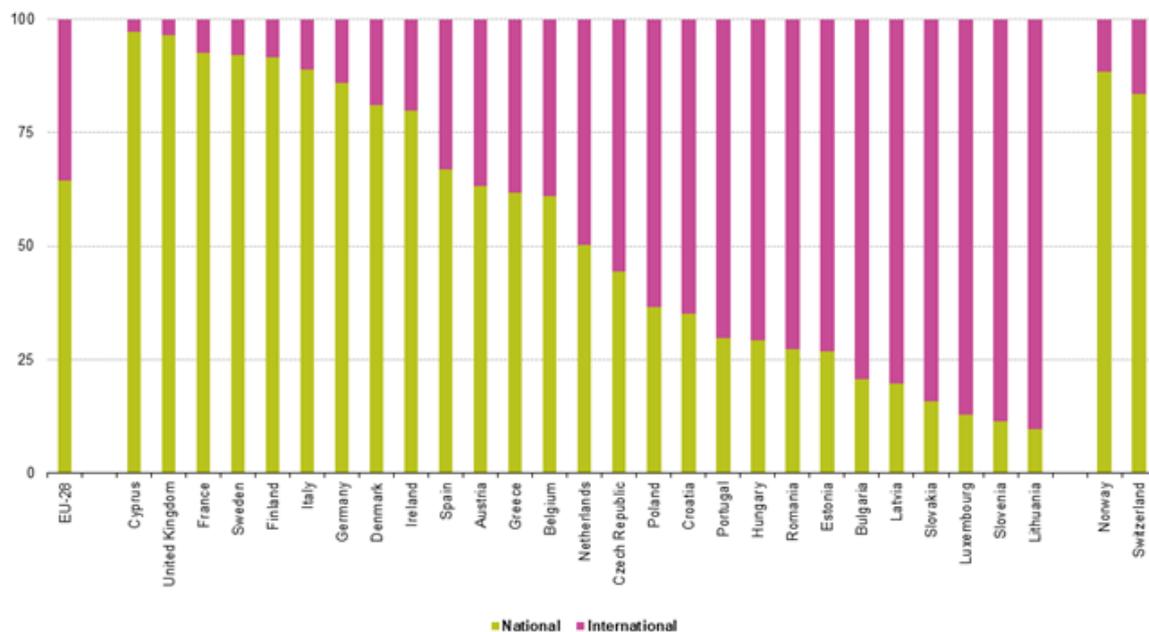
CMR and related EU legislation. The results of legislation analysis lead to necessary follow-up actions and recommendations.

Also, the cross-border e-CMR use case of 3PL will be described, covering key benefits delivered for the parties involved in e-CMR daily cross-border use. This part of the study will concentrate on modelling the process and transactions of the involved parties. Thus, the procedures and activities identified in the modelling process can be assessed in order to estimate significant add value or enhance security, or safety, and provide opportunities for facilitation actions. That should allow highlighting application opportunities to countries, businesses, institutions.

2. SWOT Analysis

The current situation on the digitalization of the cross-border electronic Consignment note is presented below by using a SWOT analysis.

Main Strengths identified are related to transportation service and competences. Around three-quarters of total inland freight transport flows in the EU are carried by roads. The ability to move goods safely, quickly and cost-efficiently to markets is essential for cross-border trade and economic development. The rapid increase of trade flows among countries and the implementation of a wide range of best practices (i.e. economies of scale, the consolidation of international freights), means the relatively fast growth of freight transport in the Baltic-Nordic region. Such demands for paperless and environment-friendly solutions, like cross-border e-CMR. Also industry reports that e-CMR solution would deliver great value to the entire industry. Below are the flows specified as the share of freights carried on the international and national level by road transport (Fig. 1).



(% based on million tonne-kilometres of laden transport)
 Note: Malta not available.
 Source: Eurostat (online data code: road_go_ta_tot)



Fig. 1 National and international road transport of goods, 2016

First, e-CMR was officially launched in January 2017 for the cross-board case between Spain and France¹⁰, where controlling institution can get emails or text messages during inspection. All other countries are prompt to join and increasing the potential for common benefit. There are DIGINNO project partner countries that have implemented national Consignment note, which has been locally called in various names (EE e-CMR solutions, i.VAZ, etc.). There is no central e-CMR database in Estonia what could be used in information exchange by public and private sector. Same time, EDI service providers can provide e-CMR solutions, like Intepia, MobiCarnet, Waybiller, but these e-CMR solutions do not support UNECE standard for e-CMR used in information exchange and CEF e-Delivery standard.

In general, national solutions are used for the same purpose – the transfer of freight delivery documents intended to transmit, receive and use electronic waybills for road freight transport in the territory of the country, not the Baltic-Nordic region. Some national solutions are working as B2B systems, where the national government has limited access¹¹ to the platform for inspections (for example, in Benelux region countries). Other solutions i.VAZ and EE e-CMR have granted the access for controlling authorities to retrieve the data during inspections. For export purposes, Estonia Tax and Customs Board is also getting required e-CMR data in specified electronic format.

Regarding eID, there is a project going on between the Baltic-Nordic countries called NOBID aiming to secure borderless access for businesses using their own national eIDs to digital services throughout the Nordic-Baltic region (<https://www.difi.no/nobid>).

Summary: Some initiatives, which are important for cross-border e-CMR implementation, already took place in the Baltic-Nordic region countries.

The lack of developments on e-CMR in the EU is identified as the biggest Weakness. Currently, there is lack of cooperation related to the issue mentioned above. By having insufficient funding support, there are only regional initiatives upcoming. Strains on IT infrastructure supporting this initiative are coupled with constraints such as technical standards, interoperability and governance issues, which slow down the development of cross-border e-CMR within freight transport sectors among the European Union's and Region's countries. Despite the lack of general rules on electronic documents for freight transport and the digitalization of transport operations, Digital Transport and Logistics Forum (DTLF)¹² is launched on EU level, which has the objective of the subgroup on electronic documents (the e-document subgroup) to promote and facilitate the use of transport documents in an electronic format. In 2016, the DTLF had called for the development of a standard for the e-CMR mainly to support the interoperability of different e-CMR solutions. Anyway, the technical interoperability is not yet in place. None of the Baltic region countries has implemented technical standards. In comparison, Denmark already has 4 technical standards implemented for the needs of the cross-border e-CMR solution.

The excellent option is that country's legislation does not prescribe technical standards and some Baltic Region countries have Qualified Electronic Signatures (QES) implemented. QES is present in Estonia, Lithuania, Latvia, Poland and, however not present in Nordic countries: in Norway only 'Simple' Electronic Signature is implemented and in Denmark – Advanced Electronic Signature (AdES).

¹⁰ Luxembourg. <https://guichet.public.lu/en/entreprises/marche-international/transport/routier/agrement-fournisseur-lettre-voiture-electrique.html>; <https://trans.info/en/first-cross-border-intermodal-transport-using-e-cmr-128562>

¹¹ Ability to send text message to the Inspector during the Inspection.

¹² COMMISSION STAFF WORKING DOCUMENT, IMPACT ASSESSMENT, Accompanying the document, Proposal for a Regulation of the European Parliament and of the Council on electronic freight transport information {COM(2018) 279 final} - {SEC(2018) 231 final} - {SWD(2018) 184 final}

Summary: Countries do not have technical interoperability in place covering cross-border e-CMR needs.

To better compete in the Baltic-Nordic Region with an e-CMR solution, there is a necessity to have a strong partnership. Firstly, inside the country by creation of common voice, better utilization of existing resources and competences. Secondly, by cooperating wider with neighbor countries. Thirdly, by integrating existing technologies for new solutions and developing them to gain higher operational speed in freight transport, also, to improve supply chain visibility with electronic consignment notes helping to deal with cabotage, to have e-CMR for implemented for import/export customs declaration and/or border control.

Those are the main Opportunities identified. Apart from that B2B sector is foreseeing several more options:

1. The electronic application is seen as multi-lingual, providing the actual state in real-time;
2. E-CMR will be cheaper to process due to the better and faster recording during cross-border operation;
3. It is planned to re-use of information in the created databases for other activities;
4. Solution will increase business opportunities to have better customer service and improve collaboration and transparency with partners;
5. It is expected to have faster processing of information/documents by the authorities and minimized e-CMR archiving requirements.

Summary: The opportunities identified are important for the delivery of more friendly solution corresponding the business needs.

Main Threat is concerning the dependency on IT systems, and the lack of contingency plan has also been identified under the implementation of cross-border e-CMR.

The technology providers from countries having implemented e-CMR solution, are identifying the main risk, which is treated as barrier for e-CMR implementation, in particular, the adoption of internationally harmonized regulatory enactments. Digitalization would require raising awareness, deliver training and exchange experience practices at institutional, national and regional levels and the agreement of data structure among cross-border e-CMR solution stakeholders.

In addition, planning the move to Single Window concept, which is empathized by UNECE¹³, new and innovative ways of working are required. Moreover, lastly, the risk is identified to get interoperable data exchange system (i.e. transfer formats and data channels). This means that necessary to reach technical interoperability with electronic custom clearance and other e-trade solutions, where the implementation of cross-border e-CMR is the fundamental stage for other solutions become available. Data contained in CMR usually is reused when preparing further transportation documents in the transportation chain. Usually, this means re-entrance of data by hand from printed CMR documents. Thousands of customs brokers, logistics operators, carriers' hours are spent for this kind of data re-entrance each day.

To reach this stage, the digitalization of CMR and its data in other processes is mandatory.

Summary: The main threat is ability to reach Single Window solution where data is reported by business via e-CMR is used for other national tax and customs needs.

¹³ According UNECE, e-CMR message model is a part of other Master models in trade and transport by various modes.

3. International Supply Chain Reference Model

E-CMR solution will be used in context of supply chain and interlinked with other supply chain processes and documents.

BPAWG develops the Reference Model for International Supply Chain for the use within the United Nations Centre for Trade Facilitation and Electronic Business (abbreviated UN/CEFACT).

The Reference model specifies key actors and activities. Herein, a shipment operation is treated as an identifiable collection of one or more Trade Items (available to be) transported together from the Seller (Original Consignor/Shipper) to the Buyer (Final/Ultimate Consignee):

- A Shipment can only be destined for one Buyer;
- A Shipment can be made up of some or all Trade Items from one or more Sales Orders;
- A Shipment can have only one Customs Unique Consignment Reference (UCR);
- A Shipment may form part or all a Consignment or may be transported in different Consignments.



Fig. 2 Key Actors/Roles associated with main Business Areas

Various actors are involved in supply chain activities, including carrier and customs. Supply chain processes cover the interconnection of activities. Among them, the main activities where a standard CMR waybill developed by the International Road Transport Union (IRU) is provided: Logistical and Regulatory activities.

To transfer Goods from the country of origin to the country of destination Logistical activity is implied and performed by transferring Goods through short and long-distance transport networks.

Usually, Regulatory activity is given at the beginning of the freight journey and the end of it. In general, Regulatory activity is aiming the declaration of Goods and is implied in the country of origin and country of destination and/or at the places of crossing borders during Goods transportation.

Consignments passing from country origin to country destination entirely within supply chain would benefit from a e-CMR simplified procedure, where only one submission would be required for authorities control and declaration purposes.

4. Stakeholders and roles

An e-CMR solution can easily be implemented without involvement of the stakeholders mentioned. In fact existing systems are often implemented by the transport companies without any of these actors. To reach the benefits of implementing e-CMR and their realization in full, following stakeholders should be involved

On national level:

- The Parliament – provides regulation ensuring legal and technological interoperability for the installation of cross-border e-CMR;
- The Ministry of Justice – ensures that national legislation is in line with the e-CMR law and international freight rules;
- The Ministry of Transport – coordinates the work of road and transport;
- The Tax and Customs Board – controls cargo movements on the roads;
- The Transport Agency – has responsibility of regulation and supervision in the area of traffic;
- The Police – controls road and freight traffic and documents;
- The Courts – execute law for arbitration;
- The Banks and Insurance companies – provides payment and insurance services;
- Technology providers – support the implementation of digitalized solution for cross-border e-CMR, promote technological interoperability;
- Private sector companies – implement e-CMR solution;
- Industry associations – accompany their members towards e-CMR transition.

Herein presented stakeholders and roles matrix connects potential stakeholders and their interests and roles, executing the implementation of cross-border e-CMR solution (Implementation role), further administration (Administration role), and daily e-CMR control on the road (Control role).

Following the best practices of e-CMR implementation from France, Spain¹⁴ and the UK, it is suggested to have under Implementation role the Ministries of Transport of countries taking a leading role during the cross-border e-CMR implementation phase. The Ministry of Transport and Infrastructure of Spain was fully supporting the e-CMR implementation. As well, the Ministry of State for Transport in France showed strong commitment to encouraging more fluid supply chain operations, and in turn to the promotion of growth and competitiveness towards fully digital deployment of transport operations. The development of cross-border e-CMR solution and its implementation also involved The Department of Transport in United Kingdom. In addition, associations of carriers (i.e. French association FNTR and Spanish association ASTIC) were present on cross-border e-CMR implementation¹⁵.

Other cases on prototyping e-CMR solution in the Netherlands and the Benelux countries also brought The Ministry of infrastructure and water management to be in leading the implementation role¹⁶ position.

The institution leading e-CMR solution implementation (i.e. having Implementation role) must adopt national legislation. To ensure that regulation is going to meet legal and technological interoperability, national technology providers have expressed big interest to participate in its

¹⁴ <https://trans.info/en/first-cross-border-intermodal-transport-using-e-cmr-128562>

¹⁵ <http://ecgassociation.eu/Portals/0/Documentation/e-CMR/E-CMR-TransFollow-final.pdf>

¹⁶ http://www.unece.org/fileadmin/DAM/trans/doc/2018/sc1/ECE-TRANS-SC1-S-_Present-2018-7e.pdf

revision phase. The implementation of cross-border e-CMR is foreseen as an essential initiative for Single Window solution installation, also as an option providing digital proof of freight delivery.

Each administrating authority (i.e. having Administration role) has a legal responsibility to maintain and manage the e-CMR system. Administrating authorities could initiate e-CMR system developments, secure compliance with its obligations and so is expected to work closely with those who are managing e-CMR system ensuring that those responsibilities are met.

Controlling authorities (i.e. having Control role) could automate control and risk analyses after e-CMR is implemented. In this way, the e-CMR solution can help eliminate irregularities and fraud.

The Questionnaire (presented in Annex D) was constructed and provided for stakeholders to specify which roles are foreseen in countries for the Institutions of national governments, which implement e-CMR solution and adopt national legislation (below roles are presented for these institutions). The stakeholder's engagement in Denmark, Estonia, Lithuania, Poland is summarized below in Fig. 3.

Implementation role	Administration role	Control role
DK - The Danish Ministry of Justice	DK - The Danish transport, Construction and Housing Authority	DK - The Danish Police
EE - The Ministry of Economic Affairs and Communications of Estonia	EE - Estonian Road Administration under the Ministry of Economic Affairs and Communications	EE - The Tax and Customs Board in Estonia, The Estonian Police and Border Guard Board
LT - The Ministry of Transport and Communications of Lithuania, and/or The Ministry of Finance of Lithuania	LT - The State tax inspectorate under the Ministry of Finance of Lithuania	LT - The Customs of Republic of Lithuania, Lithuanian Transport Safety Administration, The Lithuania Police
PL - The Ministry of Entrepreneurship and Technology of Poland and/or The Ministry of Infrastructure of Poland	PL - The Ministry of Infrastructure of Poland	PL - The Polish General Inspectorate of Road Transport

Fig. 3 Stakeholders and roles matrix (Denmark, Estonia, Lithuania and Poland case)

Several institutions listed above (Fig. 3) have the significance of roles in specified countries (Denmark, Estonia, Lithuania, and Poland) example. Below the role of these institutions is emphasized:

- a) The significance of role was given to The Danish Ministry of Justice to decide the scope of the legality of CMR.
- b) The significance of role is given to The Ministry of Economic Affairs and Communications in Estonia, which is holding the register of economic activities, and it is foreseen that the validation of the business entity important for e-CMR solution could be easier implemented.
- c) The significance of role is expected from the Ministry of Transport and Communications of the Republic of Lithuania. It coordinates the work of road, transport and electronic communications sector and implements the strategy and politics of state government and

fulfils the requirements of European Union legislation in the areas of transport and electronic communications.

- d) The significant role is given to the Ministry of Finance of the Republic of Lithuania, which has initiated the national e-waybills implementation system for control purposes.
- e) The significance of role is expected from the Ministry of Infrastructure of Poland. It controls the work of transport, constructions, maritime and digitization and implements the strategy of infrastructure.
- f) The significance of role is given to the Danish transport, Construction and Housing Authority, being responsible for regulation and supervision in the area of traffic, including for contributing to the drafting of regulations and guidelines, administration of the rules of the Road Act.
- g) The significance of role is foreseen for the Estonian Road Administration (ERA), which is a government agency operating within the administrative area of the Ministry of Economic Affairs and Communications. On the basis and to the extent prescribed by law, the ERA performs the implementation of state policy and development programs, management functions, state supervision, and applies the enforcement powers of the state in the field of road management, traffic safety, public transport and the environmental safety of vehicles.
- h) The significance of role is expected from State Tax Inspectorate (STI) in Lithuania, which is operating within the administrative area of the Ministry of Finance and is the owner of local e-waybills systems (i.VAZ). STI is one of the control institutions, which is involved in cargo movement control on the roads. During control actions i.VAZ system is used to ensure compliance of regularity of waybills data transition to the i.VAZ system.
- i) The significance of role is expected from the Ministry of Entrepreneurship and Technology of Poland, which is responsible for economic issues, issues related to economic security and supervising the provision of services related to electronic signature.

These are the most suitable institutions in taking implementation and administration roles at countries.

5. Legal aspects

The rules of the international transportation of goods are covered in the United Nations Convention on the Contract for the International Carriage of Goods by Road, which is known as the CMR. In 1956, the CMR convention was adopted. Subsequently, in 1976, IRU developed a CMR consignment note in cooperation with the International Chamber of Commerce (ICC), which was updated in 2007. In general, the CMR consignment note, used by most, if not all parties to contracts contracting countries, presents information about the shipped goods, sending and receiving parties, and transport.

From 2008, when the Additional Protocol to the CMR concerning the electronic Consignment note (e-CMR) was signed, more countries are joining the initiative. At present 15 Member States have ratified or acceded to the protocol <https://www.unece.org/trans/maps/un-transport-agreements-and-conventions-27.html> (also Denmark, Estonia, Latvia, Lithuania, and Poland), this is still not the case for all the Member States. As legislation varies per countries, shortly is presented Estonia case. Herein, the identification of new international agreement for Country stakeholders, and notice on entry into force (together with official national translation) was delivered by Ministry of Foreign Affairs of Estonia Republic.

The Additional Protocol to the Convention on the Contract for the International Carriage of Goods by Road (CMR) concerning the Electronic Consignment Note (Geneva 27 May 2008) states clearly that the Electronic Consignment note shall be authenticated by the parties to the contract of

carriage with means of electronic signature (Article 3). The Electronic Consignment note should include the same content as its paper version.

The legislative initiative started in 2018 has been leveraging the potential of digitalization in the transport sector through fostering the recognition of freight transport documents in an electronic form by authorities and /or commercial partners, and their wider use by transport operators (legislative, incl. impact assessment, Art. 91 TFEU, Q2 2018).

Still supporting e-CMR, the European Commission aims to ensure the full applicability of the international conventions' provisions concerning the legal equivalence of the electronic contracts of carriage in all EU Member States¹⁷ (and to issue a Directive or Regulation concerning this aiming to harmonize national legislations). It encourages all concerned Member States become party to the respective conventions and, subsequently, by taking measures to ensure that specific national provisions do not prevent the applicability of all the different mode-specific conventions provisions concerning the legal equivalence of the electronic contracts – either by modifying the respective national provisions or by modifying the provisions in the respective international conventions that give precedence to the applicability of specific national provisions. Calls to ensure ratification of the e-CMR protocol by all Member States have been strongest and most often made by most categories of stakeholders. The main explanation lies in the relatively lowest level of digitalization of the transport information exchange in the road sector compared to the other transport modes, correlated to the relatively lowest level of adherence by the Member States to the e-CMR protocol compared to the other mode-specific international conventions including provisions on the use of the electronically evidenced or concluded contract of carriage. The road stakeholders have emerged, as a consequence, the most motivated and most active in promoting the road digitalization agenda in various multimodal fora. Getting the road sector up to the other modes' speed eventually emerged as the most stringent need, with the ratification of the e-CMR by all Member States as the “low-hanging fruit” ripe for immediate action (SWD(2018)279).

Several countries have started operations and pilots of potential e-CMR solutions without having a common approach on the data content of a potential e-CMR message. However, the main challenge is still to standardize and harmonize messages related to electronic road consignment note (e-CMR) to be exchanged between the actors of a supply chain. An electronic message representing the e-CMR will have the same evidentiary value and produce the same effects as that consignment note foreseen by the CMR Convention (UN/CEFACT: BUSINESS REQUIREMENTS SPECIFICATION (BRS) for e-CMR).

In addition, steps must be taken to ensure the integrity of the information. The e-CMR (in addition to mandatory elements such as name and address) must contain the data needed to maintain the integrity of the archived documents. An e-CMR that meets the above requirements will be considered as proof of cargo delivery.

Provisions should also be made for data exchange between DIGINNO project partner Countries (International contracts or Protocols on more intense cooperation between countries are recommended).

Some other suggestions regarding e-CMR regulation that follows from the Pilot project of Benelux countries are provided in the subsection of Legal recommendations herein below.

6. Cross-border e-CMR model

Intending to harmonize and simplify international road transport, the first model of the CMR consignment note was suggested in 1976. Considering the advances in the field of transport, after

¹⁷ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52018PC0279>

30 years the IRU has proposed CMR model version in 2007¹⁸. It was brought up to date to better satisfy the needs of the contracting parties of carriage of goods and simplify the use of the consignment note. It should also be noted that certain countries (including Belgium) have imposed their own model Consignment Note for use in administrative controls.

The mentioned proposed CMR model describes how this model should be filled in by the carrier or the organizer of freight transportation, to best protect parties' rights and interests, but still do not encourages the transition to an electronic form. However, some countries do not use the proposed CMR model, but other models. With the development of the use of e-CMR, the consignor can, in the context of a consignment note based on the CMR model, check, at any time, the receipt of the goods by the consignee. Still CMR model covers the cases when CMR documents are printed and signed manually and carried in the road. They must be copied and to be updated. At the same time archiving and storage of physical printed documents is a challenge for information exchange between logistics operators

Following business needs, a new e-CMR model must be created. The design of e-CMR must apply "digital by default" and "once only" principles. The "digital by default" principle must be incorporated into the government's policy that has created far more customer-friendly access to Government services. The "once only" principle must be an e-government concept that aims to ensure that institutions and business only must provide certain standard information to the authorities and administrations once. These principles are settled further in the study under architectural solution.

The document of e-CMR consignment note contains all the most essential data from the invoice, the packaging list, export (EX1) and transit (T1) declarations. Following the "once only" principle primary data sources are also stated below to have filled Fields of electronic document form of Consignment note. To encourage electronic form of CMR, e-CMR model was proposed. Below information is provided for all Fields (Annex A) of document form:

Field 1 – Sender (Consignor), Field 2 – Receiver (Consignee), in many cases the pair "sender-receiver" means "seller-buyer". Data about the sender/seller and the receiver/buyer is recorded into e-CMR from the invoice. The actual consignor and the actual consignee responsible for the dispatch and receipt of the goods are first identified by digital/electronic signature and/or seals in Field 22 (cargo shipped) and in Field 24 (cargo accepted).

Cargo sender is filling the place of loading and the place of delivery (Field 3 and Field 4).

In Field 5, all numbers of additional freight documents (invoice, packing list, certificates of conformity and origin, etc.) are listed here. These could be recorded from original documents.

Fields 6–12 (marks and numbers, number of packages, method of packing, nature of the goods, statistical number, gross weight, volume in cubic meters). The data placed into such fields as the total weight (gross) and volume in cubic meters is recorded from the packing list. Particular indications concerning dangerous goods (abbreviated DG), i.e. safety class from ADR transport document for DG.

Fields 16 and 17 include the details of the carriers (first and other ones if the freight was carried out by several carriers). Carriers record these fields.

Field 18 is particularly essential for the carrier. There are notes on cargo damage; in particular, it is stated the nature of the defects and the amount of cargo damaged. Field 18 holds other useful indications such as the license plate number of the vehicle, load capacity, the net weight of the goods, the number of the TIR Carnet or any other relevant document.

¹⁸ IRU. <https://www.iru.org/resources/iru-library/iru-cmr-model-2007>

Field 19 is mentioned for charges and usually is not filled.

Field 20 may include exclusive agreements, such as insurance conditions, time of transport. This Field is appropriate to provide value declaration of the goods recorded to e-CMR from invoice and the amount representing particular interest at the time of delivery, the agreed time limit within which the transport must be carried out.

Field 21 contains the place and date of issuing the e-CMR. E-CMR could be formed in advance only the date of Field 21 could be specified when freight is leaving the place of loading.

Field 23 shall contain the number of the trip document, the name of the driver, and it is digital/electronic signature and/or the carrier's seal. The driver must be aware that by signing electronically on behalf of the carrier, he signs a contract for the goods transportation. Therefore, before placing the digital signature, he must make sure that the carrier is satisfied with the terms of the transaction.

Field 24 is for the consignee's approval about freight delivery.

Field 25 the license plate number of the vehicle.

E-CMR validation is essential for these mandatory fields (applicable for validation policies):

Fields 1-15 must be filled by the sender;

Fields 16 and 18 to be filled by the initial carrier;

Field 17 to be filled by the successive carrier;

Field 21 to be filled by the initial carrier;

Field 22 to be filled by initial carrier and sender;

Fields 23, 25 and 26 to be filled by the initial carrier and successive carrier;

Field 24 to be filled by the receiver.

The information provided to other fields depends on specific cases. In case of a successive carrier, Field 17 is filled by stating freight receipt and acceptance date and time and placing digital/electronic signature to avoid separate act confirming freight take overstatement. Moreover, Field 25 the license plate number of the vehicle to be updated in the system by providing the license plate number of the successive vehicle.

In the case of the country has slightly adopted the paper Consignment note version, the digitalized Consignment note version must be aligned accordingly. For example, aligned CMR format by Lithuania has additional Fields, i.e. 26 and above 26, which are carrier Fields to place information related to tariffs per kilometer.

Comparing CMR with e-CMR extra data could be incorporated:

Field 0 – indexing of e-CMR to be delivered in such a way that five first numbers are representing the country's national system ID;

Fields 1-2 and Fields 16-17 could include company code. By entering the company code, other fields of these Fields could be automatically filled;

Field 10 includes Combined nomenclature classification (CN) developed following Council Regulation (EEC) No 2658/87 on the tariff and statistical nomenclature and the Common Customs Tariff. The Combined Nomenclature serves as a basis for the calculation of import (export) duties and taxes, as well as for the accumulation of data on goods used for the compilation of trade

statistics of the Community. Combined Nomenclature (CN) 2019 is set out in Annex I of Commission Implementing Regulation (EU) No 2018/1602 (ZIP) of 11 October 2018;

Fields 22-24 could include electronic time-stamps recorded in addition to other data.

These 24 Fields are mandatory Fields to be present in electronic form of e-CMR, but e-CMR could have also additional optional Fields based on specific usage and implementation needs.

e-CMR could have various additional procedures such as:

- (a) Cancellation. E-CMR must have a cancellation option by stating one of the reason codes:
 - 1. Issuing error;
 - 2. Commercial transaction suspended;
 - 3. No shipment started on the day of shipment;
 - 4. Other.
- (b) Return. The e-CMR procedure must follow freight return possibility: the change of freight receiver by stating reason code – the return of freight.
- (c) Closure. E-CMR is closed when the receiver accepts the freight and states the number of packages is accepted in response to Field 7 by notifying in percentage (100% or 98%, or any other).

Usually, e-CMR is created by specific enterprise software. The e-CMR Fields data could be provided directly to the system or from ERP, WMS or other business information systems by using interface, messaging standard and web service for the data transfer. e-CMR can also be easily integrated with other services used by transport companies, e.g. customs declaration or transport and fleet management services. The mentioned three parties integrated also benefit from the increased overall efficiency of logistics, resulting in increased economic competitiveness. A final benefit is more excellent road safety, as e-CMR can be linked to eCall, a system for trucks that automatically dials emergency services in the event of a road traffic accident.

In summary, the e-CMR model includes such main elements (which are mandatory particulars):

- (a) The index of e-CMR, the date of the Consignment note, and the place at which it is made out;
- (b) The details of the sender, consignee, and carrier;
- (c) The place and the date of taking over of the goods and the place designated for delivery;
- (d) The description in common use of the nature of the goods and the method of packing, and, in the case of dangerous goods, their generally recognized description;
- (e) The number of packages and their special marks and numbers;
- (f) The gross weight of the goods or their quantity otherwise expressed;
- (g) Charges relating to the carriage (carriage charges, supplementary charges, customs duties and other charges incurred from the making of the contract to the time of delivery);
- (h) The necessary instructions for Customs and other formalities.

The document form of e-CMR contains all the most essential data from other documents, such as invoice, packaging list, export (EX1) and transit (T1) declarations, Intrastat and excised information

reporting. Below is table scanning a field of other associated documents which are important for Single Window implementation.

Table 1. The fields of invoice, packing list, and import and export declaration

No	Fields of Invoice	Fields of the Packing List	Fields of Import/Export declaration
1	Information on the exporter and the importer (name and address)	Information on the exporter, the importer and the carrier	Identifying data of the parties involved in the operation (importer, exporter, representative, and their addresses)
2	Date of issue	Date of issue	
3	Invoice number	Number of the freight invoice	
4	Description of the goods (name, quality, etc.)	Content of each package (description of the goods and number of items per package)	Identifying data of the goods (Tariff code, description)
5	Unit of measure	Type of packaging (drum, crate, carton, box, barrel, bag, etc.)	Unit of measure
6	Quantity of goods	Number of packages	Quantity (Units, Packing)
7	Unit value		
8	Total item value		
9	Total invoice value and currency of payment		Commercial and financial information (invoice value, invoice currency, exchange rate, insurance, transportation if applicable, etc.)
10	The terms of payment (method and date of payment, discounts, etc.)		Declaration and method of payment of import taxes (tariff duties, VAT, excises, etc.)
11	The terms of delivery according to the appropriate Incoterm		Incoterm condition
12	Means of transport		Information referred to the means of transport
13		Marks and numbers	
14		Net weight, gross weight and measurement of the packages	Weight of unit
15			Data about the country of origin, country of export and destination
16			Custom approved treatment (release for free circulation, release for consumption, temporary importation, transit, etc.)
17			List of documents provided (import licenses, inspection certificates, a document of origin, transport document, commercial invoice, etc.)

The data stated under the Import/Export declaration, are also important for Statistical purposes (Intrastat forms for incoming and outgoing freights). All fields except 10 and 17 referring to the payment method of duties and the list of documents provided in addition, are used for Intrastat submission to the Statistical department in national country.

Among the fields stated above, some of them are similar to e-CMR Data Fields. Below are placed 7 examples:

1. e-CMR has Fields 1-2 and 16 which are similar to field 1 stated in Table 1;
2. e-CMR Field 5 is adequate to the field 17 from Table 1;
3. e-CMR Field 7 corresponds to the field 6 from Table 1;
4. e-CMR Field 10 is related to field 4 from Table 1;
5. e-CMR Field 15 is close to the field 11 from Table 1;
6. e-CMR Field 11 is related to field 14 from Table 1;
7. e-CMR has Field 20 which is similar to field 9 stated on Table 1;
8. e-CMR has Field 21 which is similar to field 2 stated on Table 1.

Excise information system requires as well above mentioned elements stated on e-CMR and other documents: place of loading (e-CMR Field 3), place of delivery (e-CMR Field 4), number of invoice (field 3 from Table 1), Combined nomenclature classification (e-CMR Field 10), date of issue (e-CMR Field 21), Gross weight (e-CMR Field 11), Net weight (field 14 from Table 1), Quantity of goods (field 6 from Table 1), Unit of measure (field 5 from Table 1), License plate number of the vehicle (e-CMR Field 25), Responsible for transport (e-CMR Field 1 or 2).

This shows the way how information in documents could be interlinked between e-CMR and other the documents (invoice, packing list and Import/Export declaration and/or Intrastat document and/or Excise information system and/or national waybill). Further on more documents used in transport chain could be added to the landscape of interlinkage.

7. Use Case: Description of B2B processes cross-border e-CMR of 3PL

The e-CMR implementation will open new opportunities for all actors involved in transport chain. The installation of cross-border e-CMR solution brings these gains:

1. Guarantees faster administration (reduces manual data entry, paper handling, fax/scan/letter exchanges, paper archiving, and handling costs, increases data accuracy and speed of issuing other trade documents);
2. Allows control and monitoring of the shipment providing real-time access to the information & proof of pick-up and delivery;
3. Provides integration possibility with customs declaration services;
4. Reduces the environmental impact of global trade by increasing efficiency, using less paper and minimizing archival requirements;
5. Increases road safety, e.g. by linking e-CMR to eCall (automated emergency call for trucks).

Business process modelling is used a formalized way of describing how a business/market operates and thus enables a common understanding of the critical features/requirements for the development. The description of the process also enables identification of opportunities for simplification and harmonization of business and administrative procedures.

To bring insights on the process, more detailed layers are provided. The process is built from several layers: the highest-level, mid-level and detail level. The highest-level process is presented under the Fig.4. It includes process activities but does not specifies roles. The mid-level of process specifies roles and freight way (Fig. 5). The detail level of the process is specified under the Annex B. It includes roles, freight way and document level.

Depending on the Member State authorities inspect Consignment note for some or all the following purposes: verification of legitimate possession; enforcement of rules related to safety, customs, environmental protection and security, cabotage, and various transport conditions.

Across the Members States, differences in inspection practices are equally present, even when the same type of authority is performing control for the same regulatory purposes in the same transport mode.

The description of Case study is provided following Fig. 5:

- a. **Pickup LOAD/Carrier1.** Carrier1 arrives at the Shipper Loading point/Warehouse to collect the freight. The freight is loaded. The Shipper provides Electronic Consignment note (e-CMR) to the Carrier1.
- b. **Sign the e-CMR.** The Carrier1 completes provided e-CMR by confirming it. According CMR Convention Driver needs to place take-over of freight on e-CMR on the Field 16 (Initial carrier main data), fill Field 23 (driver name and signature), and Field 25 (truck and trailer numbers). Driver by signing e-CMR must provide the Number (No) of e-CMR to the internal Carrier1 company database, where it could be kept as the reference to Transport order.
- c. **Drop LOAD to Terminal.** Carrier1 arrives at the Terminal. The driver is directed to the required dock, and the goods are unloaded to the Terminal. The driver presents the No of e-CMR. The Terminal confirms the take-over of freight on e-CMR. The driver leaves the site.
- d. **Pickup LOAD from Terminal & get e-CMR.** Carrier2 arrives at pick-up freight:
 1. If Terminal contracts Carrier2, Carrier2 gets No of e-CMR from the Terminal;
 2. If Carrier2 is a new company, the company which manage transport gives the No of e-CMR to the successive Driver or Terminal transfers No of e-CMR to the Carrier2.

After the freight pick-up, the Carrier2 confirms the take-over of freight on e-CMR. According CMR Convention Driver needs to place take-over of freight on e-CMR on the Field 17 (Sequential carrier main data), fill Field 23 (driver name and signature), and Field 25 (truck and trailer numbers).

- e. **Drop LOAD.** The Carrier2 arrives at Unloading point. The freight is unloaded. The Carrier2 presents the No of e-CMR. The Receiver/Unloading point signs off e-CMR. Carrier2 is required to note any deviation on the e-CMR, e.g. waiting hours, quantities, packaging, etc. and it must be signed by the Receiver/Unloading point and the Carrier2.

If Shipper organizes the appointments for pick-up and drop-off, in that case, the timing of pick-up and drop-off is communicated directly to the Carriers by specifying Special conditions on e-CMR.

During a-e stages authority can control e-CMR Consignment notes of freights, which are present in the truck. So, only these e-CMR Consignment notes must be retrieved for controlling purposes.

The summary of process actors and their roles is provided below in Fig. 6.



Fig. 4 Cross-border e-CMR illustrated: the highest-level process
Source: author's visual



Fig. 6 Roles in process cross-border e-CMR of 3PL

In 3PL case (Fig. 6), Transport Service Provider acts as Carrier. In that case, Transport Service Provider (Road transport operator) is treated as any company, which provides a transport service note. The transport service provider can be a freight carrier (acting directly for shippers or as sub-contractor for another freight carrier or a freight forwarder), a freight forwarder, and a logistics service provider which provides transport services.

In order to understand the whole challenge of switching from cross-border CMR to the cross-border e-CMR stage, the elements analysis framework is used.

e-CMR Elements Analysis Framework

The digitalization of each element of Consignment note means the new way of working for the stakeholder. It was asked by stakeholders to notify, how the implementation of electronic Consignment note approaches might affect them in terms of work added (e.g. more computer monitoring work, etc.) and work removed (e.g. manual work removed, jobs eliminated).

For scanning the change, which it brings to each stakeholder's activity, the views of stakeholders revealed with questionnaire. Stakeholders responded by stating concrete e-CMR model element listed under Paragraph 6 and is important for their activity and have specified how this element will affect their work.

The information was reached on this point from Main Road transport Inspectorate, which has specified how e-CMR will change the work of road transport inspectors.

Table 2. The effect expected from e-CMR implementation comparing with current paper CMR case

e-CMR Element	Stakeholder involved	Work Removed / possible impacts	Work Added / possible impacts
(a) The date of the Consignment note and the place at which it is made out	Main Road transport Inspectorate	It is expected to have verification of data and greater reliability	Additional activity will be required to hardware support and data updating
(b) The details of the sender, consignee, and carrier			
(c) The place and the date of taking over of the goods and the place designated for delivery			
(d) The description in common use of the nature of the goods and the method of packing, and, in the case of dangerous goods, their generally recognized description		No changes are foreseen. The inspector must still check the data personally.	
(e) The number of packages and their special marks and numbers			
(f) The gross weight of the goods or their quantity otherwise expressed		It is foreseen as small change in the process of Main road transport Inspectorate	

First three e-CMR elements (a-c as stated in Table above) are essential for the improvement of the inspectors of Main Road transport Inspectorate work.

Other two e-CMR elements (d and e as stated in Table above) anyway, must be checked by inspectors personally, so, no changes are foreseen.

The last one e-CMR element (f as stated in Table above) is seen as small change in the process of Main road transport Inspectorate.

In the industry's view, the acceptance by banks and insurance companies of the electronic Consignment note, particularly those that evidence the contract of carriage, would improve the situation. Insurance companies would have data online reporting on which days the truck is delivering freight and on which days it is not.

In the case of custom brokers, all transit declarations and financial guarantees are prepared from paper documents, after being in digital form, these documents are not transferred further on. But by getting some part of digital data custom brokers could speed up the import process.

A specific economic assessment could be carried out through the prism of cost-effectiveness after the implementation of cross-border e-CMR solution by Main stakeholders.

8. Architectural solution

For the use of cross-border e-CMR by public authorities, the main question is how to connect to a national database of another country. To specify the option, the architectural solution is delivered.

The architectural breakdown structure is presented in Fig. 7. It is used to split up into country level and sectoral level. The sectoral level is separated its smaller components (private and public sector) incorporating their roles under the national layer.

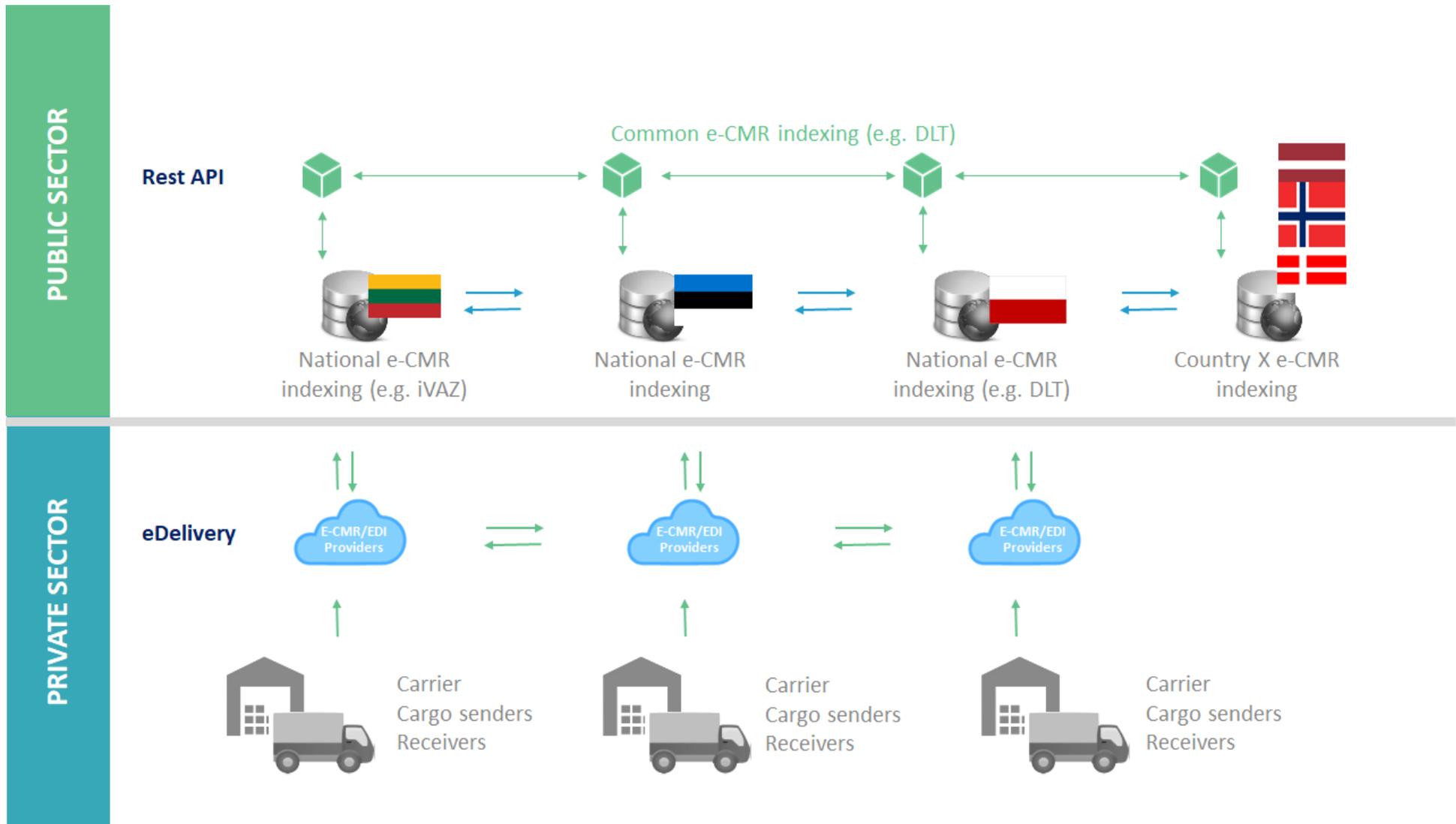


Fig. 7 Cross-border e-CMR architectural solution

(Source: Hurt, Hintsov, Mering, Lusti, Vedler, Single Window Initiative Estonia, 2019. Amended by Digilno project partners May 2019)¹⁹

¹⁹ Single Window Initiative Estonia, www.singlewindow.ee

The pilot in Poland proved that exchanging of e-Freight messages with eDelivery is easy, scalable and low in costs. No point-to-point connection is required. Communication and transparency are enhanced with standardized, unambiguous and secure messages exchanged between all parties. Logistics service provider could build transparent communication to clients regarding agreements, planning, execution and status reports to transportation network controllers.

eDelivery supports public administrations, businesses engaged in shared business processes in an electronic way by exchanging event-notifications and e-Documents in a flexible interoperable, secure, reliable, and trusted way. eDelivery standard is already implemented in some scale by several DIGINNO project partners countries: Denmark, Lithuania, Norway, Poland.

The proper eDelivery solution allows transport operators to input electronically, store logistics information and exchange data, in real-time via a mobile phone or tablet. The timely recording of data means that authorities instantly receive information on the goods being transported. Also, here all required subsequent actions, happen faster and at fewer costs. The move towards e-CMR it is suggested to implement validation of data, to limit the potential for human error and adopt multi-language format for seamless international application (according to UNECE ITC suggestion).

The e-CMR platform must consider future technologies for verification of road haulage documentation and supplementing information from registries (ex. Community license, e-invoicing, etc.). The service provider should cover data protection issues and data access management. Data exchange with public registries is foreseen as a machine-to-machine connection. Certified archiving could be placed under the state-owned platform or accredited service providers.

For the indexing and sharing data among countries, REST API technology is taken. The technology allows communication between a web-based client and server that employs representational state transfer (REST) constraints.

The functional architecture of the e-CMR solution is presented under Fig. 8.

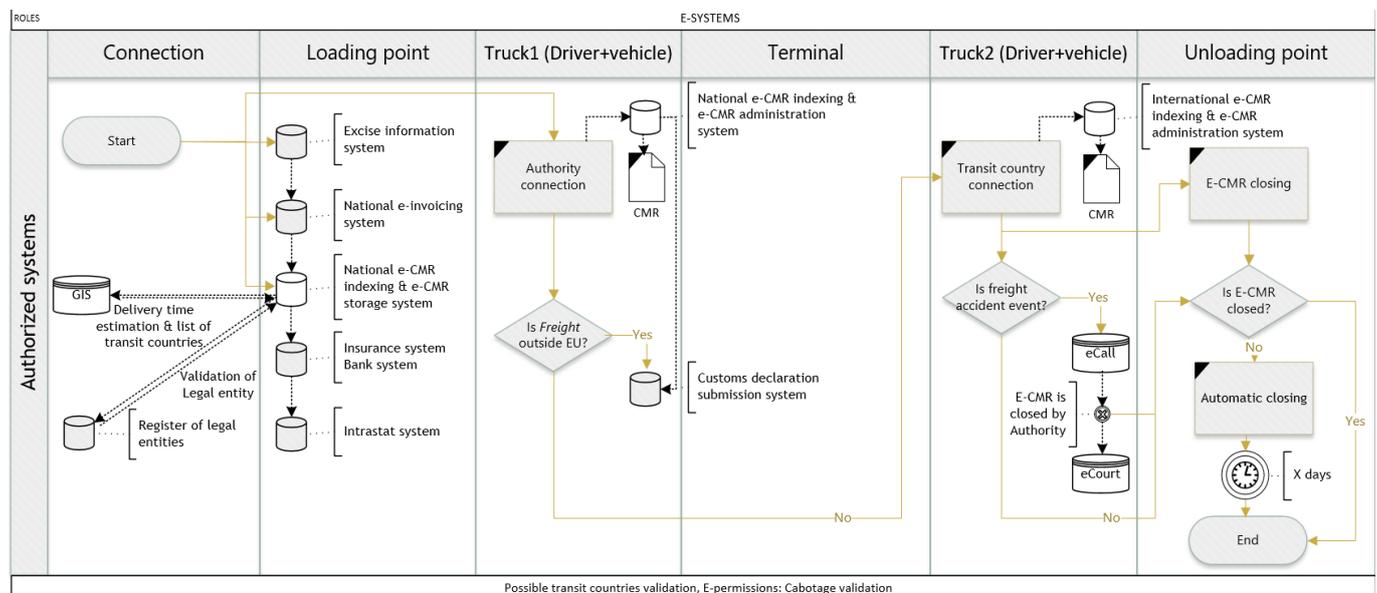


Fig. 8 Suggested functional business-to-business architecture of e-CMR solution

As the national country has a various system in place, national e-CMR indexing and administration system must be interlinked with other relevant systems, like Excise information system, National e-invoicing system, Intrastat reporting system and Custom declaration submission system. Validation of juridical data listed into e-CMR could be provided retrieving data from the e-Register system, matching if all entities are reported in the system and has the right to provide carriage economic activity. Service providers format the data if necessary and validate relevant content, also identify the identities. National e-CMR indexing and administration system must be available to the connection of authorities, both national and international. For the connection of authority identification must be in place, specifying the e-CMR document fields to be accessed and the format. In order to increase road safety, the e-CMR solution could be linked with eCall (automated emergency call for trucks). In the case of a road accident and freight damage, the authority of any country needs to have the right to terminate e-CMR.

The closing of the paperless Consignment note is foreseen for freight receiver and is recommended to be implemented to avoid trash in the national e-CMR indexing and administration system.

9. Recommendations

There are different types of recommendations. They are separated under the block named as solution design, legal, and technical recommendations.

Solution Design recommendations

The design of e-CMR must to respond to the best practices of European Union by using the CEF e-delivery infrastructure. PEPPOL e-delivery support is already implemented in Denmark. The example of realization of best practices could be e-invoicing implementation on European Union level.

The design of e-CMR must apply principles "digital by default" and "once only". Industry and many governments must increase efficiency by going digital. Efficiency could come from the incorporation of various e-Government systems (national e-CMR indexing and storage system, excise information system, statistical declaration system, e-custom system, e-invoicing system, e-Court system, etc.) into a national digital Single Window. By delivering such necessity, the integration is required between e-Government systems. Validation of juridical data and the type of economic activity for the party listed into e-CMR could be provided retrieving data from the e-Register system, which has recent information on European Union level synchronized once a calendar day.

The declaration of transit countries could be included in the e-CMR system as data provided by the carrier. Such could guarantee shorter carrier disruption during the authorities' inspection case, when the controlling authority is accessing cross-border e-CMR system. Moreover, it would also strengthen the control of authorities, which would be able to match declared transit flow with actual transit flow at the point of control installed in transit country. For that, electronic data infrastructure must be developed.

For prototyping it is recommended to develop solution compliant with the Architectural Decision agreed upon in the DIGINNO project (and is presented under Fig. 7). The architectural solution agreed to implement through the eDelivery principle, a consensus standard between the parties and a messaging format. The central system in the country is recommended for maintenance of central index.

It is recommended to have accreditation for Technology service providers as eligible ones, which are accredited to supply electronic consignment notes delivery. To implement accreditation process, National Government must appoint the national authority, which is responsible for accreditation. Based on Benelux region example provided, the Ministry of Mobility and Public Works is appointed for the accreditation under Benelux countries. After accreditation, Technology service providers in Benelux

countries are excluded from the list of accredited suppliers, if their technology no longer meets the conditions of the Benelux Decision and/or the protocol: the electronic consignment note no longer contains the same information as the paper consignment note; the process used for the establishment of the note no longer guarantees the integrity of the information contained in it (full and unaltered indications); and the information contained in the note is no longer be supplemented or modified²⁰.

During e-CMR implementation pilots are optionally selected and delivered by industry. In the transitional period it is recommended to have both paper-based and electronic-based Consignment notes. The end of the transition period could be specified by authorities giving time for the industry to prepare for paperless Consignment note and their usage in daily operations early in advance.

The implementation of complex cross-border e-CMR solution could be separated into four phases: (1) prototype implementation, (2) the installation of simplified fully working solution, (3) the establishment of advanced solution and (4) provision of solution covering Single Window concept. The realization of first two phases could last around 2-3 years. The achievement of advanced solution could take 5-6 years, in accordance to Estonian project partners' estimation. The provision of solution supporting Single Window concept depends on priorities of National governments.

Technical recommendations

Each country has their own technical solutions and state systems already invested, so, in order to ensure technical interoperability for cross-border e-CMR solution it is recommended to use such technical standards:

1. Compatibility and reliance on international e-CMR standard, which is developed by United Nations Economic Commission for Europe (abbreviated UNECE) and the first version is launched on 2018.02.16.
2. E-identification and authentication standards in accordance with eIDAS, supported by ENISA.
3. Digital/electronic signature and/or seal (e-Seal) standard, which is provided by same eIDAS framework;
4. Digital time-stamp in accordance with eIDAS;
5. E-Security standards meeting the eGovernance and secure data exchange levels;
6. EU-wide accepted file format and delivery standards, incl Connecting Europe Facility (CEF eDelivery building block);
7. Indexing format and standard which are applied in compliance with eGovernance principles, implemented possibly also partially with Distributed Ledger Technologies solutions;
8. Electronic Archiving standards²¹; with specific requirements or technical/organizational aspects. Standard is involved to reduce risks such as changing regulatory requirements and the disclosure of confidential records and can furthermore enhance the security layer of information by easily enforcing security policies and logging. Companies using the e-archive in combination with a built-in workflow engine can react to new processes, and requirements with more agility. It is recommended to align storage policies between countries, while minimized requirements for electronic archiving in comparison to paper e-CMR to have higher acceptance of e-CMR solution by business, shouldn't be forgotten.

²⁰ <https://guichet.public.lu/en/entreprises/marche-international/transport/routier/agrement-fournisseur-lettre-voiture-electrique.html>

²¹ Such as ISO27000 ISMS and/or ISAE3000 SOC

Adoption of common standards and interoperability is highly appreciated rather than specific software implementation in the context of e-CMR. On the other hand, all solutions and standards chosen must be compatible with eGovernance solutions in the applying countries to allow the business-to-government data exchange.

The state control authorities must take care to become a gateway to obtain the necessary data from the national e-CMR providers to their systems, in case many e-CMR solutions are present in the country. To ensure technical interoperability recommended to dedicate the function to single institution responsible for the technical compliance. All technical standards such as e-identification and authentication (eID, eIDAS), digital/electronic signature and/or seals, e-Security and others are successfully handled by Norwegian, Danish and Estonian eGovernment and could be benchmarked.

For reaching technical interoperability, the data structure of e-CMR must be enforced by regulation. The regulation concerning technical interoperability could be updated periodically not as often as once in two years period.

Connection with other countries could be implemented by adopting CEF e-Delivery elements. National e-CMR indexing system could in long term be built up using DLT (Distributed Ledger Technologies), connection with international or global indexing systems must be foreseen for each national e-CMR indexing system.

On technical side, e-CMR fall back procedure must be stated in regulation for the cases when national e-CMR indexing and storage system is crashed. After the system begins to operate, recovery data must be restored.

Legal recommendations

To make e-CMR working internationally, a mutual agreement on sub statutory legal issues (e-CMR digitalization) is needed to initiate the most immediate effects thereof within the countries involved. The use of the electronic consignment note is made possible by article 1, paragraph 5 of the CMR Convention. The e-CMR-protocol serves as a guide for the CMR Convention. Thus, the agreement would apply to transport within the boundaries of the involved countries.

The Pilot project of Benelux countries (yet not finished) has already revealed that such kind of an agreement should acknowledge e-CMR is valid as far as it: (i) complies with art. 1-6 of the e-CMR protocol; (ii) is produced by a party with the technology of an admitted provider; (iii) is used by a reported user. The e-CMR note should contain a unique number, a digital signature and all other information as paper CMR. Also, it should be accessible and downloadable for all contracting parties.

To move forward with e-CMR implementation, it is recommended for the national governments of to ratify the Additional protocol to the Convention on the contract for international carriage of goods by road (CMR) concerning the electronic Consignment note²².

Also, naturally, many other legal aspects should be regulated. E-CMR signing procedure is of the greatest importance, especially Qualified Electronic Signatures (QES) implementation. Therefore, requirements for digital signature should be covered too. Concerning the protection of data, the public authorities shall be only allowed to use the received data in the area of their competence, not communicating these data to other not related public authorities. Also, the national and European regulation concerning privacy shall be respected. As to the whole IT system regulation, it is a repository storing of all data related to the specific e-CMR that should be the object of the relevant law. The data should be only accessible to those parties that have a specific role as to the specific e-CMR. It should offer apps to access the data, to sign

²² https://treaties.un.org/pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XI-B-11-b&chapter=11&clang=_en

for transfer of the goods. Subsequently, the system should offer a portal that allowed parties to view their freight documents and to retrieve them for printing or forwarding purposes. Firms and Authorities should follow functional Architectural solution, allowing to have efficiency increase and reduction of redundant workflows.

For cross-border e-CMR establishment it is recommended to implement sub-statutory national legal acts explaining:

1. The indexing of cross-border e-CMR,
2. The electronic form of Consignment Note by stating that is legally applicable,
3. The rules of submission of cross-border e-CMR,
4. The information exchange between DIGINNO project partner countries.

To ease the burden on business, it is recommended to foresee the option in legislation that national waybills could be reported by using e-CMR data structure and technical standards and by setting the time for such option appearance.

The implementation of cross-border e-CMR solution, which meets technical interoperability, could be funded from European Union structural funds.

Definitions

The additional terms used are defined in the CEF Definitions section on the CEF Digital Single Web Portal: <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/CEF+Definitions>

The main terms appear in the definitions placed below.

Authority	Statutory body existing within a jurisdiction and a specific area of responsibility that administers legislation to regulate trade and/or monitors compliance with existing legislation.
Cross-border e-CMR	The Contract for the International Carriage of Goods by Road in electronic form, referring to Additional protocol to the Convention implementation.
eDelivery	eDelivery is one of the CEF Building Blocks. It helps public administrations to exchange electronic data and documents with other public administrations, businesses and citizens, in an interoperable, secure, reliable and trusted way.
eIDAS	Electronic IDentification, Authentication and trust Services is an EU regulation on / a set of standards for electronic identification and trust services for electronic transactions in the European Single Market. eIDAS provides a predictable regulatory environment to enable secure and seamless electronic interactions between businesses, citizens and public authorities.
e-Signature	An electronic signature, or e-signature, refers to data in electronic form, which is logically associated with other data in electronic form and which is used by the signatory to sign. This type of signature provides the same legal standing as a handwritten signature as long as it adheres to the requirements of the specific regulation it was created under (e.g., eIDAS in the European Union).
Impact Analysis Framework	The parts correspond to how an approach is used to accomplish impact analysis, how an approach does impact analysis internally, and the effectiveness of the impact analysis approach.

Import/ Export Declaration Party	Documents by which consignments of goods are declared for either export or import Customs clearance. The term “party” refers to a state that gives its explicit consent to be bound by the treaty. This explicit consent is generally in the form of ratification or accession.
Interoperability	Interoperability is the ability of disparate and diverse organizations to interact towards mutually beneficial and agreed common goals, involving the sharing of information and knowledge between the organizations, through the business processes they support, by means of the exchange of data between their respective ICT systems.
Ratification	Ratification defines the international act whereby a state indicates its consent to be bound to a treaty if the parties intended to show their consent by such an act. The institution of ratification grants states the necessary timeframe to seek the required approval for the treaty on the domestic level and to enact the necessary legislation to give domestic effect to that treaty.
Signature	The signature is subject to ratification, acceptance or approval, the signature does not establish the consent to be bound. However, it is a means of authentication and expresses the willingness of the signatory state to continue the treaty-making process.
Single Window	A Single Window is defined as a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single-entry point to fulfil all import, export, and transit-related regulatory requirements. If information is electronic, then individual data elements should only be submitted once.
Standard	A set of rules, conditions or requirements concerning operations; delineation of procedures; describing systems, services or practices is called technical standard. It is used the term "standard" to grew out of a need for uniformity in various areas of economic activity.

Annexes

A. CMR Transport Document form

Usually, the CMR consignment note is made out in 3 original copies, but there are waybill forms from 4,6,8, 13 pages, as well as more. If it is a CMR consignment note, if necessary, it can be investigated to make it possible, whether it is necessary for logistics and supply chain cases, where freight forwarding is subject to 3PL-10PL.

IRU initiated protocol, which requested that CMR could be managed electronically, via ‘e-CMR’ and added it to the CMR Convention. This protocol has entered into force on 5 June 2011, and to date 22 countries have acceded including: Belarus, Bulgaria, Czech, Denmark, Estonia, Finland, France, Iran (Islamic Republic of), Latvia, Lithuania, Luxembourg, Netherlands, Poland, Republic of Moldova, Romania, Russian Federation, Slovakia, Slovenia, Spain, Switzerland, Tajikistan, Turkey.

ADDITIONAL PROTOCOL TO THE CONVENTION ON THE CONTRACT FOR THE INTERNATIONAL CARRIAGE OF GOODS BY ROAD (CMR) CONCERNING THE ELECTRONIC CONSIGNMENT NOTE states that electronic Consignment note should include the same content as its paper version.

CMR Transport Document form is displayed below.

1 Consignor (name, address, country)		International waybill This transport operation has to be carried out according to the Convention on the contract for the international carriage of goods by road (CMR), irrespective of any other contracts									
2 Consignee (name, address, country)		16 Carrier forwarder (name, address, country)									
3 Place of delivery of the goods Place Country		17 Successive carriers (name, address, country)									
4 Place and date of taking over of the goods Place Country Date		18 Carrier's reservations and observations									
5 Annexed documents											
6 Marks and Nos	7 Number of pack	8 Method of packing	9 Nat. of the goods	10 Stat.No.	11 Gross w. in kg	12 Volume in m ³					
											
Class		Digit		Symbol		ADR					
13 Sender's instructions (Customs and other formalities)			19 To be paid by:		Sender		Currency				
			Carr. charges				Consignee				
			Reductions -								
			Balance								
			Supp. charges								
			Other ch.								
			Miscellaneous -								
			Tot. to be paid								
14 Cash on delivery				15 Payment				20 Special agreements			
Freight paid				Freight to be paid							
21 Established in		Date		24 Good received		Date: on ____ 201__					
22 Arrival to loading: __h__ min.		23 Waybill Nr.		Arrival to unloading: __h__ min.							
Departure __h__ min.		Drivers		Departure __h__ min.							
Signature and stamp of the sender		Names, Surnames		Signature and stamp of the carrier		Signature and stamp of the consignee					
25 Identification number		26 Type									
Truck Trailer		Truck Trailer									

Statements for the As-Is model

Box 1 Name and complete address of the consignor of the goods

Box 2 Name and complete address of the consignee of the goods

Box 3 The foreseen place of delivery of the goods. It is recommended to ask the consignor to indicate the opening hours of the warehouse or depot where the delivery will take place. This mention would avoid the carrier having an expensive and unnecessary wait if he arrived outside of opening hours.

Box 4 Place and date when the goods are taken into charge by the carrier. It is recommended that the carrier indicate the hour of arrival of the vehicle at the place of loading and the hour of departure. These annotations are useful in the event if the vehicle remains standing over a period due to the consignor of the goods, to enable the carrier to obtain remuneration.

Box 5 List of the documents handed by the consignor to the carrier (for example, loading list, certificates of origin of the goods, etc.).

Boxes 6-12 correspond to the usual description of the transported goods, including, if applicable, special indications concerning dangerous goods.

Box 13 Particular instructions of the consignor. If necessary, the consignor is expected to indicate instructions that could affect the transport, such as the instructions concerning Customs procedures, the ban on transshipment of the goods, insurance of the goods or any other instruction he deems useful.

Box 14 The indication of the amount of reimbursement transferred by the consignee and to be received by the carrier at the time of the delivery of the goods. Warning: following the CMR Convention (Article 21), the carrier is bound to remunerate the consignor for the exact amount of the reimbursement if the goods were delivered to the consignee without the said reimbursement being settled at delivery.

Box 15 Payment. It states who pays the transport. It could also indicate the Incoterms applied to sales transactions.

Box 16 Name and complete address of the carrier, other references if applicable.

Box 17 This box is intended for the eventuality that the transport is carried out by **several carriers** who carry out the voyage successively. This box, if applicable, should be filled in at the moment when the successive carrier takes the goods into charge – these indications will be noted at least on the consignment note intended for the consignee (second copy) and on the copy intended for administrative procedures). If it is foreseen that the transport is carried out by several successive carriers, it is essential that the copy of the consignment note intended for the consignee has at least a record of the carrier who will deliver the goods. The successive carrier must date and sign the box ("goods received and accepted", "date" sections). Here he can also indicate the reservations concerning the number of packages, their identifying marks and numbers, the apparent state of the goods and their packaging at the time of taking into charge. If there is a lack of space, the reservations can be written elsewhere (for example on the back of the consignment note), but as clear indication on the consignment note. It should state that reservations were made, and these should be validated by the carrier who carried out the part of the transport preceding the taking into charge by the successive carrier.

1 Consignor (name, address, country)		International waybill This transport operation has to be carried out according to the Convention on the contract for the international carriage of goods by road (CMR), irrespective of any other contracts				
2 Consignee (name, address, country)		16 Carrier forwarder (name, address, country)				
3 Place of delivery of the goods Place Country		17 Successive carriers (name, address, country)				
4 Place and date of taking over of the goods Place Country		18 Carrier's reservations and observations				
Date						
5 Annexed documents						
6 Marks and Nos	7 Number of pack	8 Method of packing	9 Nat. of the goods	10 Stat.No.	11 Gross w. in kg	12 Volume in m ³
						
Class		Digit		Symbol		ADR
13 Sender's instructions (Customs and other formalities)			19 To be paid by:	Sender	Currency	Consignee
			Carr. charges			
			Reductions -			
			Balance			
			Supp. charges			
			Other ch.			
			Miscellaneous +			
			Tot. to be paid			
14 Cash on delivery						
15 Payment		20 Special agreements				
Freight paid						
Freight to be paid						
21 Established in		Date		24 Good received		Date: on ____ 201__
Arrival to loading: __h__ min.		23 Waybill Nr.		Arrival to unloading: __h__ min.		
Departure __h__ min.		Drivers		Departure __h__ min.		
Signature and stamp of the sender		Names, Surnames		Signature and stamp of the consignee		
25 Identification number		26 Signature and stamp of the carrier				
Truck		Type				
Trailer		Truck				
		Trailer				



Statements for the As-Is model

Box 18 Reservations and observations of the carrier at the time of taking the goods into charges, such as the number of packages, their identifying marks and numbers and their packaging. The consignor must validate these reservations if they are to be valid.

Box 19 Indications concerning the amount of the different payments relating to the transport contract established as well as the indication of the party who is bound to carry out the payment. If the carrier is not capable or if he judges it irrelevant to indicate the exact amount of the payments due, he is strongly advised to at least indicate the party responsible for the payment in order to avoid future discussions in this respect.

Box 20 Particular agreements between the consignor and the carrier such as the declared value of the goods and the amount representing particular interest at the time of delivery, the agreed time limit, within which the transport must be carried out. Also, it states the possibility of using open non-sheeted vehicles, the use of palletes, the record of the person responsible for loading, stowing and unloading, the admission of the transport onto a ferry, the applicable jurisdiction or any other indication deemed to be useful by the parties to the transport contract.

Box 21 Place and date of the establishment of the consignment note.

Box 22 Signature and stamp of the consignor (choice is left to the consignor).

Box 23 Signature and stamp of the carrier (choice is left to the carrier).

Box 24 Signature and stamp of the consignee confirming delivery of the goods, indicating the place, the date and mainly quoting the time of arrival of the vehicle at the place of delivery and subsequent departure following the unloading. These remarks are useful in the case, where the vehicle remains standing due to the consignee of the goods, in order to, if necessary, remunerate the carrier.

Box 25 Registration numbers of truck and trailer.

Box 26 Type of truck and trailer.

Colours in form:

red: copy for the consignor,

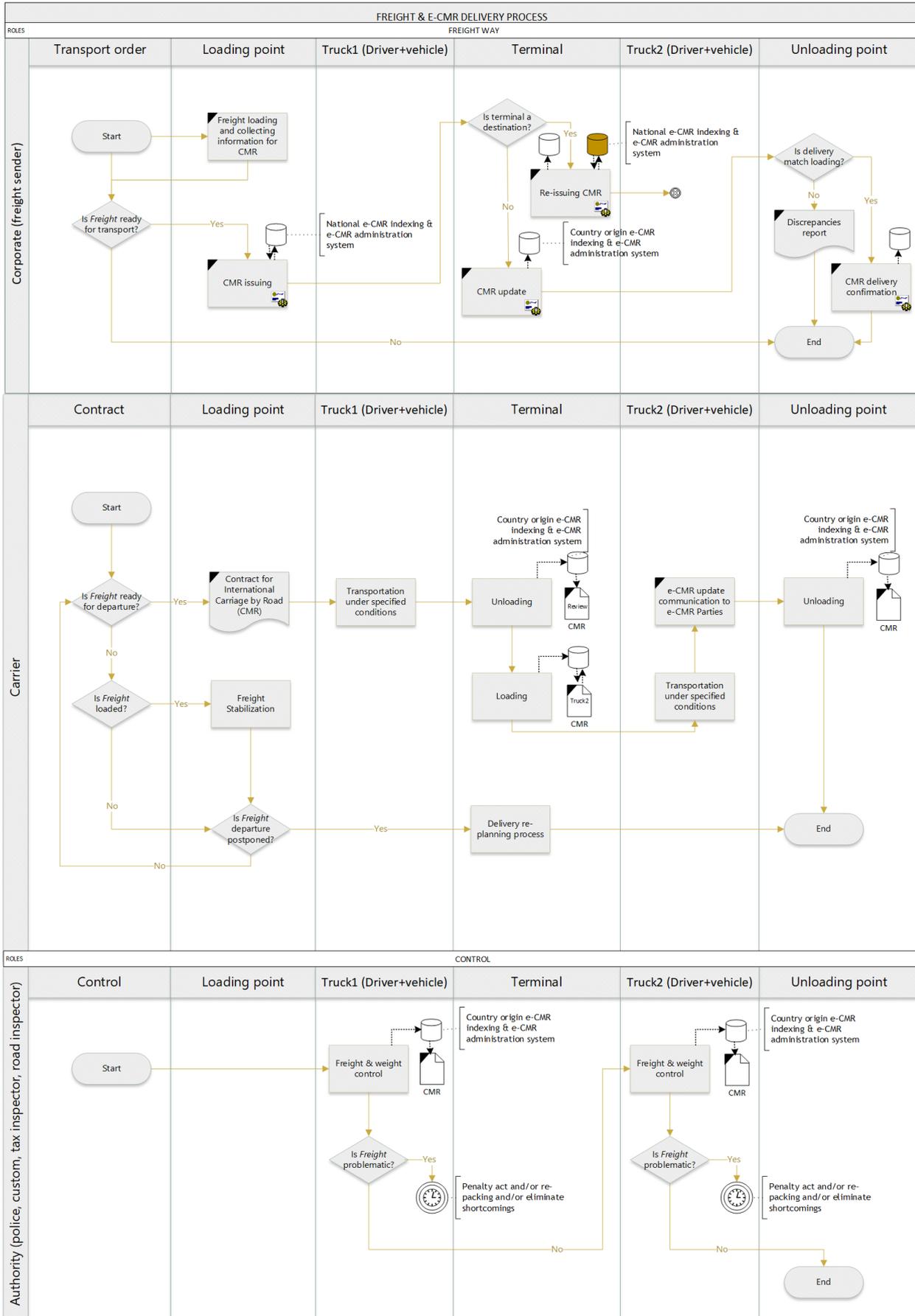
blue: copy for the consignee (this copy accompanies the goods throughout the entire transport),

green: copy for the carrier,

black: copy is reserved for administrative procedures or successive carrier.

B. Detail process

The preliminary process scheme for the eCMR, business-to-business view



Stencil



C. Best practice of Denmark

In 2015, the National government of Denmark had amended the law providing the option for e-CMR cross-border usage. However, it is up to the private sector and associations to decide how they intend to utilize e-CMR. Partially, in section 6 under the paragraphs 1-6, it is stated that electronic Consignment note must be signed electronically by all parties. It refers to the national technical standards developed for e-identification and e-signature. It specifies that the recognition of foreign e-signatures must be compatible with the OCES standards, but the mode of data transition is not specifying. Later, on 08/06/2016, LAW No. 617 was delivered, in particular, Section 7, for eIDAS adoption on e-identification and cross-border e-signature. With respect to interchangeability, the law has been amended in the way that e-CMR must be compliant with national eID solutions using eIDAS and e-signature solutions.

The law is still national centric. The legal changes cater cross-border technical interoperability, in some respect but not legal interoperability. By now some technical interoperability standards are implemented: cross-border e-CMR, digital/electronic signature and/or seals, electronic time-stamps, and security. And legislation on e-archiving is in place stating that digitalized e-CMR has the same archiving requirements than paper e-CMR.

Currently, the Danish government provides oversight responsibilities to the implementation of e-CMR. The national government has amended the laws providing the possibility for companies to implement e-CMR. The companies are to follow international standards when producing their e-CMR. There is no clear mechanism for enforcing the law. There is a need for a collective effort towards the linking of different private infrastructure to deliver a harmonized e-CMR solution, when in each country neither the Police of the Danish Transport nor Danish transport, Construction and Housing Authority should act as the gateway for data routing, and security. Apart from that, for the inspection on the road, there are tools implemented for data access required by inspectors.

The digitalized CMR must be user-friendly, as there is the risk of rejection of e-CMR due to user unfriendliness. There is the case in Denmark when customers of carrier find that the paper CMR was more user-friendly than its electronic version.

In Denmark, e-CMR is not coordinated by a public sector agency as such. Rather it is the private transport companies that develop their solution. As it is, it is not mandatory for them to adopt e-CMR, it is optional. So, some transport companies have not adopted it.

D. Best practice of Lithuania

Firstly, having come into effect in 2011 the e-CMR Protocol has obtained the power of an international treaty in the hierarchy of national statutory law, i.e. it prevails over national legal acts. Therefore, in terms of legal technique, only sub-statutory legal acts are needed as far as IT issues regarding e-CMR implementation and usage are resolved.

Subsequently, the legal framework for e-CMR at a national level usually requires further clarification prior to implementation. In Lithuania, for example, as regards legal regulation concerning e-CMR implementation, in the first place, it would be appropriate to maintain the obligation for e-CMR document parties and e-CMR document issuers to register with an e-CMR on the state index platform. Also, there should be clear rules on who and how are empowered to establish rules on the provision of these data.

For convenience native legal acts should meet requirements of e-CMR protocol. For example, under the article 29⁵ of Road Transport Code of the Lithuania Republic it is stated that waybill could be accepted in electronic form:

“An electronic consignment note shall be a consignment note giving the particulars of the consignment note as drawn up and received by electronic means. The electronic consignment note may be used only with the prior consent of the carrier and the consignee. The consignor and / or the carrier must ensure, at the time of presentation of the consignment note, that the consignment note originates in an authentic, homogeneous and legible manner. The origin of the consignment note shall be the authenticity of the identity of the consignor and / or the carrier, the integrity of the contents of the consignment note being the absence of modification of the consignment note (excluding technical errors). The legibility of a bill of lading means that the bill of lading is legible and presented in such a way that all its contents are clearly legible on paper or on the screen, without the need for further interpretation or examination. The origin of the electronic consignment note, and the integrity of its content shall be ensured by at least one of the following means:

- 1) Using a secure electronic signature as established by the Republic of Lithuania Law on Electronic Signature;*
- 2) Using the services of the State Tax Inspectorate under the Ministry of Finance of Lithuania for issuing, transmitting and receiving electronic waybills;*
- 3) By any means of business control (any procedure established and implemented by responsible persons (managers, owners, employees) which is intended to ensure proper compliance with the requirements of this part applicable to the electronic consignment note).”²³*

Submission of electronic national waybills is regulated by the Lithuanian Tax Administration Act (“Submission of data on packing slips and other cargo transport documents to the State Tax Inspectorate”). According it, taxpayers must submit waybills and other shipping documents as of October 1, 2016 in accordance with the approved rules for submission (“Rules for the submission of data on the Consignment Notes and other Goods transport documents to the State Tax Inspectorate”).

Some issues regarding e-CMR apparent obligations to the government institutions, including but not limited to the tax authorities, should be considered too. For example, some analogy to article 42³ of the Lithuanian Tax Administration Act (“Submission of data on packing slips and other cargo transport documents”) might be considered. E-CMR document parties and e-CMR document issuers who send, transport or receive goods by road shall be obliged to submit to the State Tax Inspectorate the data of an e-CMR note. The Content of this data, as well as the procedures and deadlines established to provide it to the authorities, shall be determined legally to meet e-CMR content requirements respectively and ensure authenticity thereof.

i.VAZ subsystem (central database for national waybills) is implemented by Lithuanian State Tax Authority from the 1st of October 2016. The subsystem provides waybill reporting functionality.

²³ Road Transport Code of the Lithuania Republic <https://www.e-tar.lt/portal/lt/legalAct/TAR.65AD818F5F9C/xdiJMMDkui>

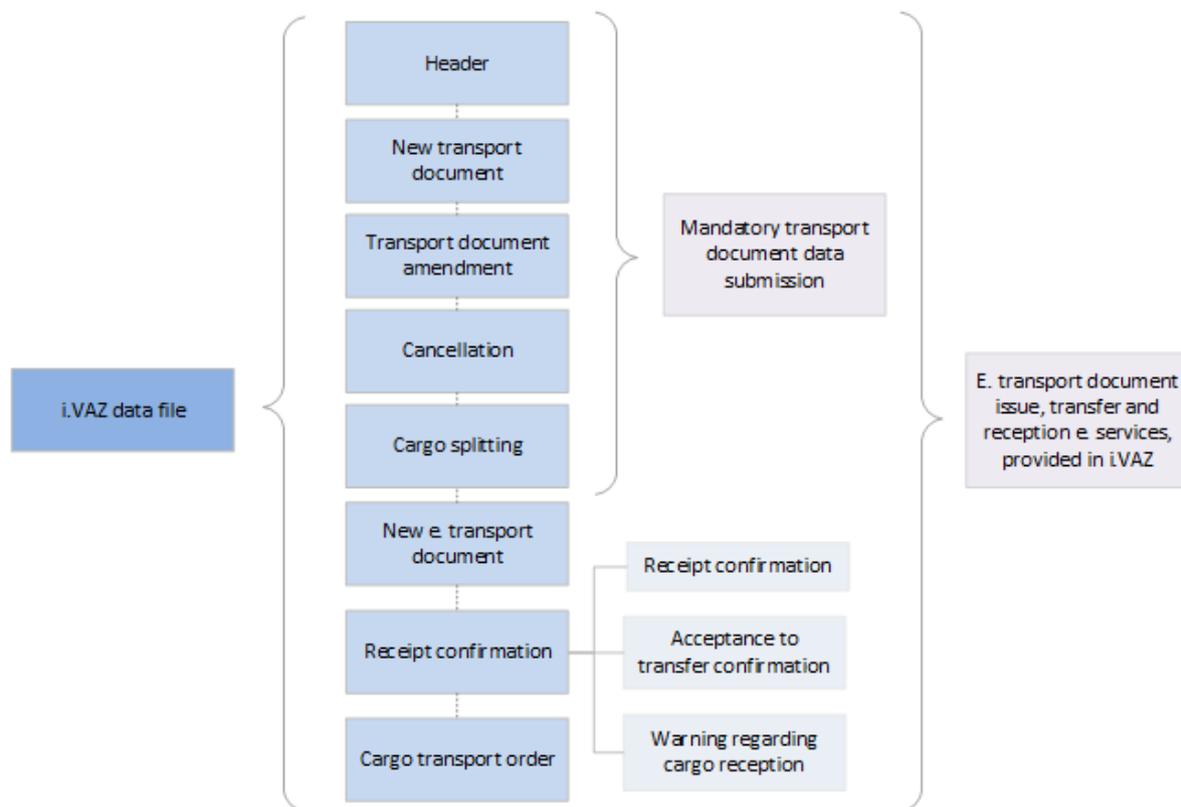


Fig. Summary of i.VAZ data file structure

It allows to submit transport document data in the following ways:

- o By filling in transport document data entry form on the website;
- o Uploading a data file on the website;
- o By using data submission web services, data transfer from business ERP and/or WMS systems.

i.VAZ subsystem has functionality to present transporter order²⁴ of the shipment and present opportunity to accept or decline order. By presented order basis it allows to write out electronic freight delivery document and by using it, write out electronic VAT invoice. Companies could confirm that shipment is accepted to ship and/or passed on to consignee and add an additional document with a shipment comment. Subsystem allows to issue cargo receipt confirmation, view transport document history and compare versions of transport documents. Companies could create and manage blanks of transport documents, download and print filled transport documents; divide (split) transport documents and create joint transport documents through i.VAZ subsystem (the figure is placed under Annex E).

Backup data for waybill (a.VAZ) is implemented and can be accessed in two ways:

- o Internet-accessible backup a.VAZ website;
- o Increased rate SMS is sent by phone.

²⁴ Order - an offer made by the sender and desired to be transported to the vehicle (as defined in Road Transport Code of the Lithuania Republic).

When there is problem for submitting waybill, spare registration number (SRN) is created in a.VAZ that can be shown in case of inspection. Lithuanian State Tax Authority provides possibility for each company to generate SRN daily. The usage of SRN does not exempt from liability to have transport document and to upload full transport document later. Waybills must be uploaded to the subsystem after technical difficulties are removed from transport document maker's system.

I.VAZ national waybill document Fields contains such information: Data of parties (e-CMR Fields 1-2) and Carrier (e-CMR Field 16); Departure time (e-CMR Field 21), Arrival time (e-CMR Field 24), Place of Loading (e-CMR Field 3), Place of Delivery (e-CMR Field 4); Data about freight and ADR class (e-CMR Fields 6-12); Other information (charges, documents, instructions for Carrier) (e-CMR Fields: 5 & 19-20).

In general, i.VAZ national waybill covers all main elements (mandatory particulars) of e-CMR model but still some additional fields must be included (like, e-CMR Fields 13-15 Particular instructions and Indications, including payment; e-CMR Field 17 representing Successive Carrier, e-CMR Field 18 Reservations and observations of the carrier, e-CMR Fields 22-23 Signatures and stamps of consignor and carrier).

Also, i.VAZ solution does not support UNECE standard for e-CMR, CEF eDelivery and e-seal standards.

E. Best practice of Estonia

In Estonia, Single Window Initiative Estonia²⁵ is established, where associations, public sector and businesses gather into a digital transport-related in the network. The main aim of the initiative is to promote and encourage the digital shift in transport-related information flow for the benefit of all market participants. For reaching the aim, the initiative works consistently on applied research on feasibility of such digitalisation as well as moderates the exchange of best practices while developing the digital solutions and prototypes.

The initiative promotes the idea that joint action in partnership is an only way to find best solutions and solve bottlenecks hindering digitalisation in regard to transport and logistics, therefore we are also getting involved in negotiations, networking and working on policy suggestions.

The cooperation partners for the initiative are of wide range- from small to large cargo owners, freight forwarders and transport businesses, infrastructure owners and service providers, ICT developers, research centres, trade and professional associations as well as public sector organisations, all of them eager to gain competitiveness and business savings through cooperation in clever solutions.

There are three e-CMR and digital waybill solutions available in Estonia:

MobiCarnet (MC) is a data exchange platform enabling to organize and automate information exchange in delivery process of shipments in road transport. This is a data exchange platform meant for use both at the level of business as well as for communication with the state. MC uses Estonian x-road when communicating with the Register of Economic Activities, Tax and Customs Board, Road Administration and Commercial Register in Estonia and in the future also with the Police and Border Guard Board. MC in Finland has been interfaced with the Register of Companies and Customs. The preliminary analysis has been conducted for the interface with e-Police and the relevant interface will be made in the course of developing legislative processes.

²⁵ Single Window Initiative Estonia, www.singlewindow.ee

Today, the police can use the internet-based pilot solution inside the MC application for the conduct of supervision by receiving e-CMR data elements to their own interface. MC has been created in cooperation with ERAA (Association of Estonian International Road Carriers) and SKAL (Finnish Transport and Logistics). The main function today is the operation of international consignment note (e-CMR) data and the use of this data package in automation of processes. MC enables to combine the information of digital consignment note with the information of the truck telemetry. It allows on the basis of the statuses of each shipment to share in controlled manner and safely all data related to the transport and/or the documents in role-based way with the different parties of the transport operation.

Process could involve all the parties of transport operation (seller, purchaser, carrier and its subcontractors, forwarders etc), outside service providers related to transport (ports, ferry operators, providers of support services etc), but also the already above mentioned state and/or municipal agencies performing supervision. MC is Cloud based service. It allows to electronically create new CMR, waybill, transit declaration, import declaration, export declaration, e-TIR and electronic guarantee document. It is able to exchange shipment documents and statuses with NCTSs (Estonia and Finland). MobiADR function advises the user in case of Dangerous Goods are carried. MobiFootprint module calculates the ecological footprint of the shipment. Technical tools and protocols: HTTPS, MVC framework, MSSQL, Azure Cloud, .NET WebAPI, RESTful Services, JSON, x-Road.

Another solution **Intepia** is a web service to control and plan supply chain. Intepia system ready to convert e-CMR file from workflow (LOAD detail info in figure below).

Intepia solution do not have an output with e-CMR format to any other system outside system. Intepia solution do not support UNCEFACT data model. Intepia CMR fields document Fields contains information about Vehicle ID (e-CMR Field 25), Successive Carrier (e-CMR Field 17), Place of Loading (e-CMR Field 3), Place of Delivery (e-CMR Field 4), Data about freight and ADR class (e-CMR Fields 6-12), also it contains Departure time (e-CMR Field 21), Arrival time (e-CMR Field 24). In general, Intepia CMR fields cover all main elements (mandatory particulars) of e-CMR model but still some additional fields must be included (like, e-CMR Fields 13-15; Particular instructions and Indications, including payment; e-CMR Field 18 Reservations and observations of the carrier, e-CMR Fields 22-23 Signatures and stamps of consignor and carrier). Technical tools and protocols: HTTPS, Ionic Framework, Couchbase database, JRuby, JSON.

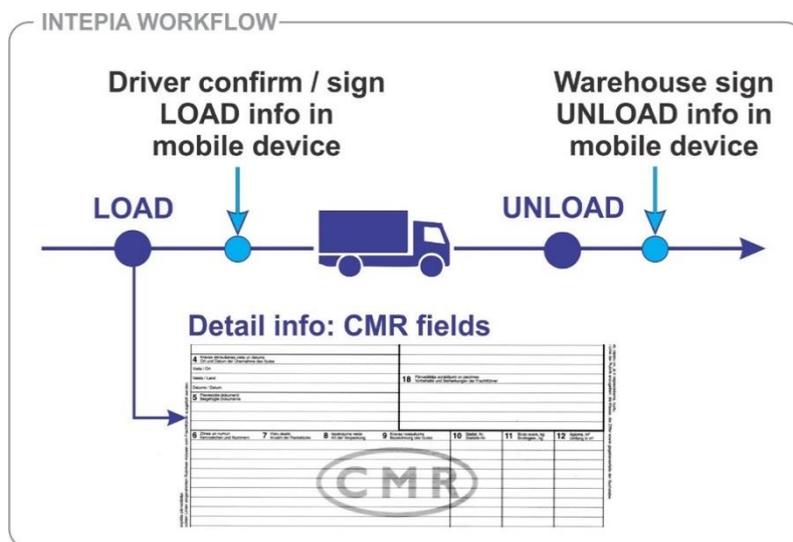


Fig. Intepia solution workflow

Waybiller is an application that specializes in inter-state transportation of goods, allowing users (mostly crop, road aggregate, and cement transporters) to exchange waybills between transporters and managers, and collect the data digitally for further processing. The solution does not currently support the e-CMR international transport standard. Rather, the system uses a standardized version of the Estonian transport document, which is available as a .pdf file on demand to drivers and receivers. Waybiller is the product of cooperation between the largest road construction companies (YIT, Nordecon) and crop-purchasers (Kevili et. al.). The result of the cooperation is a tailor-made solution for the needs of industry leaders, while focusing on user accessibility and simplicity. For that reason, the main user-side of Waybiller (the driver application) has been simplified and made into a lightweight mobile application, removing any unnecessary functionality for that group of users. The manager-side contains the archiving and data analysis side of the functionality, also allowing the managers to create transport orders for a future date, which are later accepted by their drivers. All of this can be conveniently exported into an Excel spreadsheet on demand.

The application is sanctioned by the Estonian Road Administration and currently in use in state road procurements as a way to digitalize waybill information for a better overview of the cost-effectiveness of road-building companies.

As per Estonian law, a transport document in a digital format is accepted by the police in the same way as a physical one, which makes Waybiller an extremely viable solution from the legal standpoint. Moreover, it is possible to exchange data between the police and border-patrol due to the technical frameworks Waybiller uses, so there would be no need for physical checks at all. Moreover, Waybiller has an option for GPS tracking on the mobile application, allowing to actually connect a digital waybill with a location on a map for better overview. Technical tools and protocols: Python, React.js, React Native, Django.

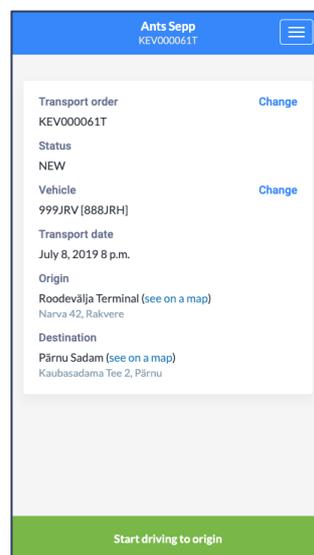


Fig. Mobile user-interface of Waybiller: The overview of the waybill before driving to the starting point

F. Questionnaire



PARTNER COUNTRY QUESTIONNAIRE ON CROSS-BORDER E-CMR

This questionnaire aims to examine the legal, technical and process interoperability and the status of the development and implementation of cross-border Electronic Consignment (e-CMR).

Cross-border e-CMR is Electronic consignment note of the Convention on the Contract for the International Carriage of Goods by Road which facilitates management of road transport with electronic means.

Most of the partner countries have implemented electronic national CMR Consignment note, which has been locally called in various names, but, in general, it is used for the same purpose – the transfer of freight delivery documents intended to transmit, receive and use electronic waybills for road freight transport in the territory of the country.

We are looking forward and seeking to proceed with cross-border Electronic Consignment (e-CMR) note in the future. The questionnaire takes into attention recent progress in the field of cross-border e-CMR digitalization taking into consideration regulatory output as well.

The questionnaire covers such roles:

1. Users: traders, intermediaries, seller, buyer, insurance provider, customs agent, road inspection, etc..
2. Technology providers
3. National government
4. National association
5. International association

Herein, national governments adopt legislation; private sector companies work closely on common process and digital solution for road transport and both types of associations accompany their members towards the technological transition.

Questions are constructed to be answered by roles:

1. Users: Questions 7-13
2. Technology providers: Questions 6-7 & 11-13
3. National government: Questions 1-8 & 12-13
4. National association: Questions 7-9 & 11-13
5. International association: Questions 7-9 & 11-13

Respondents must point the significance of their role: (1) if they are in a significant role, (2) in a minimal role or has (3) no particular role at all.

If it appears that the respondent has double role it is better to provide answers for each particular role separately.

The information will be used in the feasibility study which is being prepared by the show case lead ICT association INFOBALT, Lithuania.

To facilitate responses, please, select one option among given options, which expected to be filled with the answers.

The questionnaire includes main areas:

1. Status of legal environment
2. Standards regulated by law
3. Institutional arrangements to promote the implementation of cross-border e-CMR solution
4. Implementation of digitalized solution for cross-border e-CMR.

Respondents may wish to refer to the definitions of terms. The main terms appear in the glossary.

Contact details of the main respondent for follow up:

Name: _____

Telephone: _____

Email: _____

State Authority/Business: _____

Position: _____

Address/Country: _____

Role: _____

The significance of role: _____

How to answer the questionnaire:

- The Questionnaire should be answered electronically in English language. Please tick the appropriate boxes or provide the comments requested for each question.
- The questionnaire involves both categorical questions (e.g. yes/no) as well as open-ended qualitative questions. It would be very helpful if you can supplement your answers with more detailed information about specific practices in your country. Supplementary data, studies or articles that are important or that may be helpful should be provided in attachment and referred in the text.
- Answers should reflect the regulatory situation as recently as possible. Future regulatory actions should be clearly identified as such, also the current stage of implementation, the body responsible for the implementation and the

expected date of completion. The data should only reflect the situation as of 2019 July.

- The questions refer only to regulation or standards issued or accepted by the national level of government. National State institution may choose to also supply responses for Co-regulatory institution. If a question concerns an issue that is exclusively or primarily dealt with Co-regulatory institution, answers should be given by the chosen jurisdiction (with indication of which jurisdiction has been selected).

- We draw your attention to the need to answer the comments and qualitative questions as well.

- A glossary of terms is provided at the end of this questionnaire.

- For assistance or questions regarding the questionnaire please contact: aurelija.burinskiene@gmail.com or ruta@infobalt.lt.

INSTITUTION (coordinating the study): Association INFOBALT, Lithuania

A. STATUS OF LEGAL ENVIRONMENT

In 2008 an additional protocol was signed on Electronic Consignment Notes (e-CMR) at a meeting of the Transport Committee of the UN Economic Commission for Europe (UNECE).

1. Does Legal Environment is ready for cross-border e-CMR implementation? Yes, No <input type="checkbox"/> <input type="checkbox"/>				
<i>Please, provide details if answer is 'No'</i>				
	UNDER IMPLEMENTATION	UNDER REVIEW	PLANNED REVIEW	NOT STARTED YET
1.1 Is e-CMR Protocol ratified in the country?	□	□	□	□
1.2 Are national executive legal acts implemented concerning cross-border e-CMR being implemented?	□	□	□	□
1.3 Does legal changes match patterns of legal interoperability*	□	□	□	□
<i>*More information on legal interoperability is provided</i> http://ec.europa.eu/transparency/regexpert/index.cfm?do=groupDetail.groupMeetingDoc&docid=14276				
If the answer to 1.2 is 'YES', please, name them:				
<i>Other comments on Question 1 (if necessary):</i> <div style="border: 1px solid #ccc; height: 40px; width: 100%;"></div>				

2. Which institutions are responsible for cross-border e-CMR regulatory implementation in the country?

2.1. Please, provide details if decision is taken on national level

	Name of the institution
Main responsible institution	
Co-regulatory institution	
Other	

Comments on Question 2.1 (if necessary):

2.2.-2.4. Please, provide details below if decision is not taken yet on national level

2.2. Which institution is in the best position for regulatory purpose of cross-border e-CMR (please, specify below in text): _____

2.3. Which institution is the best in position for administration of cross-border e-CMR administration (please, specify below in text): _____

2.4. Which institution is in the best position for control of cross-border e-CMR (please, specify below in text): _____

Detailed comments on Questions 2.2, 2.3 & 2.4:

B. STANDARDS REGULATED BY LAW

When exchanging information between two countries, the following considerations must be addressed so that the exchange succeeds:

1. The information exchanged must be relevant to the situation. It must include what is needed and should leave out what is not.
2. The meaning of the information must be understood in the same way by both parties.
3. The information must be expressed in a format that both parties understand.
4. The information must be exchanged using a method that both parties can access.

Some international standards are available for the use**:

1. UNECE Organization has developed international e-CMR standard https://www.unece.org/cefact/brs/brs_index.html
2. E-Identifiers and e-authentication <https://www.enisa.europa.eu/topics/standards/standards?tab=publications>

3. Digital/electronic signature and/or seals <https://portal.etsi.org/TBSiteMap/ESI/ESIActivities.aspx>
4. Electronic Time-stamps <https://portal.etsi.org/TBSiteMap/ESI/ESIActivities.aspx>
5. Security <https://www.commoncriteriaportal.org/cc/>
6. The European Commission publish updated technical specifications for the CEF e-Archiving Building Block <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/2019/06/04/Publication+of+the+eArchiving+Building+Block+technical+specifications>

3. Does the country's legislation prescribe technical standards?**

Yes, No

Please, provide details if answer is on Question 3 is 'Yes'

3.1. Is there a formal requirement that state authority considers comparable international standards and rules before setting new national standards?

Please specify: _____

3.2. Status of technical standards implementation

Technical standards**	IMPLEMENTED	WILL BE IMPLEMENTED SOON	NOT PLANNED YET	NOT SURE
A. Cross-border e-CMR	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B. Cross-border e-Identifiers and e-authentication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C. Digital/electronic signature and/or seals	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D. Electronic Time-stamps	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
E. Security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F. Cross-border e-Archiving	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Comments on Question 3.2 (if necessary):

3.3. Please, specify which technical standard the institution is supervising (please, provide the answer below in text): _____

3.4. Please, specify which technical standard the institution is coordinating (please, provide the answer in text): _____

Comments on Questions 3.3 & 3.4:

3.5. If the answer for Question 3 is positive (i.e. 'Yes'), please indicate has your country developed national technical standards for cross-border e-CMR?

Yes, No

If 'Yes', please, identify which ones are nationally developed technical standards (according marking presented in Question 3.2)?

A B C D E F

Please, comment what are the differences between national e-CMR standard and UNECE international e-CMR standard:

Explanations of rationale for diverting from international standards when country specific standards are promoted:

4. The eIDAS Regulation (910/2014) sets the legal framework for electronic signatures in the EU. Which type of e-signature is available in the country?

	IMPLEMENTED	WILL BE IMPLEMENTED SOON	PLANNED TO BE IMPLEMENTED LATER	NOT PLANNED YET
'Simple' Electronic Signatures	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Advanced Electronic Signatures (AdES)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Qualified Electronic Signatures (QES)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The electronic signature is critical factor for the cross-border CMR process.

Please, elaborate: In respect to the regulatory environment national legislation relative to electronic signature have been amended in compliance with the eIDAS Regulation.

recommendation: 'simple' electronic signature, advanced electronic signature and qualified electronic signature. The requirements of each level build in such way that a qualified electronic signature meets the most requirements and a 'simple' electronic signature the least.

<https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/Introduction+to+e-signature>

C. INSTITUTIONAL ARRANGEMENTS TO PROMOTE THE IMPLEMENTATION OF CROSS-BORDER E- CMR SOLUTION

5. Has institution any role assigned to promote the implementation of cross-border e-CMR?

Specific example: The France and Spain example show that the leading role has Transport ministry. Joaquín del Moral, Director General de Transporte, Ministerio de Fomento (Ministry of Transport and Infrastructure), Spain, commented e-CMR implementation, “As one of the first countries to ratify the e-CMR protocol, Spain is in favour of the electronic consignment note – and therefore fully supports this initiative to test and analyse the benefits. It represents the future of logistics operations.”

Alain Vidalies, Minister of State for Transport, France, remarked during his closing speech at FNTR’s 71st Congress, “The French Government’s accession to the additional protocol to the CMR Convention in January 2017 sends a powerful message to the goods transport industry. It shows a strong commitment to encouraging more fluid supply chain operations, and in turn to the promotion of growth and competitiveness. We are looking forward to seeing – in practical terms – the benefits that e-CMR will bring to the logistics industry in France. It is the first step towards fully digital transport operations that we intend to deploy in the coming months.”

The development of cross-border e-CMR solution also involved The Department of Transport in United Kingdom.

Proposal: To consider the role of Transport ministry as leading cross-border e-CMR implementation.

Sources: www.iru.org/resources/newsroom/first-ever-border-crossing-use-e-cmr-electronic-consignment-note and <https://transfollow.org/de/news-de/first-border-crossing-e-cmr-uk-france-and-the-netherlands/>.

Answer to Question 5: Has the institution any stakeholder role assigned to promote the implementation of cross-border e-CMR?

YES <input type="checkbox"/>	NO <input type="checkbox"/>	NOT SURE <input type="checkbox"/>
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If ‘YES’, please, identify the stakeholder role:

	YES	NO	NOT SURE
Initiating and/or coordinating national activities for cross-border e-CMR implementation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Developing digital solution	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Promoting digital solution for business	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other	<i>Please specify:</i> _____		

5.1 Is the leading institution defined the scope of implementation of cross-border e-CMR?

YES <input type="checkbox"/>	NO <input type="checkbox"/>
---------------------------------	--------------------------------

Comments on main Question 5 & supporting Question 5.1 (if necessary):

D. IMPLEMENTATION OF DIGITALISED SOLUTION FOR CROSS-BORDER E-CMR

When exchanging information between two countries, the following considerations must be addressed so that the exchange succeeds. There are such defined features:

1. one-time submission
2. standardized information and documents
3. sharing of information among government agencies
4. coordinated controls and inspections of the various governmental authorities
5. allowed payment of duties and other charges
6. given source of trade flows to related government information.

6. Is digital solution for cross-border e-CMR being implemented in the country as functioning solution?

Yes		
It is Validated?	<input type="checkbox"/>	<i>Specify:</i>
It is Tested?	<input type="checkbox"/>	<i>Specify:</i>
Are Tools implemented for data access during inspection?	<input type="checkbox"/>	<i>Specify:</i>
Have data sharing contracts been signed among national institutions?	<input type="checkbox"/>	<i>Specify:</i>
Other	<input type="checkbox"/>	<i>Specify:</i>
Not implemented	<input type="checkbox"/>	
<i>If answer is 'Yes' for the last point (i.e. 'Not implemented'), please, provide information when did the changes take place? Comments:</i>		

7. Please, identify potential risks that could arise during the implementation of cross-border e-CMR:

	YES	SOMETIMES	NOT	NOT SURE
Identification, authentication and authorization	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interconnection of indexes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Interoperable data exchange system (i.e. transfer formats and data channels)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Data protection mechanisms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Adoption of internationally harmonized regulatory enactments	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____				
According to the eIDAS regulation an electronic registered delivery service is a service that makes it possible to transmit data between third parties by electronic means and provides evidence relating to the handling of the transmitted data, including proof of sending and receiving the data, and that protects transmitted data against the risk of loss, theft, damage or any unauthorized alterations.				

8. What type of benefits are expected after cross-border e-CMR launch?

Specific example: BLG Automotive Logistics (a large German logistics company) uses two million sheets of paper for the one million vehicles it transports each year. When extrapolating such data for the whole of Europe it means 16.5 million vehicles transported and 33 million sheets of paper used, representing 135 tons of wood each year. This resource would be saved if electronic consignment notes were used in all EU Member States. The costs related to paper consignment notes constitute 1.5% of the total costs of BLG Automobile Logistics.

In addition, within individual companies, a document's original paper version must often be transferred from one division of the company to another, which is another cost element that could be eliminated with the use of electronic documents.

In the Netherlands, independent studies show approximately EUR 4.50 savings in administrative costs with each CMR consignment note, with the switch to a digital CMR (Source: SIRA Consulting).

According to Transport en Logistiek Nederland (TLN), 40 million paper CMR consignment notes are used each year in the Netherlands for cross-border road transport.

Resume: The gain could be increased if more countries join e-CMR implementation initiatives. The benefits grow the new EU member states joins the same network and increases the number of out-going transactions.

	YES	SOMETIMES	NOT	NOT SURE
A digitized transport chain will require less paper, so it is better for the environment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cross-border e-CMR will save on administrative costs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
The electronic application will be multi-lingual, facilitating international transport and controls by national authorities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Electronic documents will be cheaper to process	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Currently, paperwork is possible when drivers presents documents, whereas electronic documents can be handled in real time	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved supply chain visibility with electronic consignment notes could help to deal with cabotage	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____				

9. What are expectations from process change?

Specific example: EU study shows that looking into benefits experienced per type of stakeholder, it is apparent that both types of associations and shipper/consignees are most positive about the reduced paperwork and faster administration of affairs and minimized archival requirements. Carriers experience most benefits in terms of reduced paperwork and operational times as well as higher data quality and data reuse possibilities. Forwarders and logistics service providers are most positive about reduced paperwork and operational times as well as possibilities of reusing data. The use of electronic freight transport documents is expected to bring more benefits. In general, expected benefits from the use of electronic freight transport documents range from process improvements to costs savings.

Resume: Therefore, in order to maximize benefits for all Parties involved in cross-border operations, the analyse of functions considering past CMR process and future digital e-CMR process for is essential.

	YES, SIGNIFICANTLY	YES, TO A LIMITED EXTENT	NOT REALLY	NOT SURE
Easier communication of information in multiple languages	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Improved collaboration and transparency with my business partners	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Faster processing of information/documents by the authorities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Simplified communication with the authorities (less paper work)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased business opportunities (better customer service)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Re-use of information in the created databases for other activities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Higher quality, accuracy and reliability of data (the potential of human error is reduced)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Better and faster recording during cross-border operation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Easier settlement of insurance issues and freight payment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Minimized archival requirements	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____				

10. Cross-border e-CMR Impact Analysis Framework (IAF):

The ultimate purpose is to make the digital solution of cross-border e-CMR soon. It harmonizes contractual conditions for goods transported by road and helps facilitate goods transport overall.

In order to understand the whole challenge of switching from CMR to e-CMR stage, the impact analysis framework is used. Therein, each element of Consignment note notes of how the implementation of electronic Consignment approaches might affect users’ role in terms of work added (e.g. more computer monitoring work, etc.) and work removed (e.g. manual work removed, jobs eliminated).

e-CMR model element*** <small>(Please select the proper one from dropdown)</small>	Overall process impact	Work Removed / possible impacts	Work Added / possible impacts
Select an element.			

***- The model elements (mandatory particulars):

- (a) The date of the consignment note and the place at which it is made out
- (b) The details of the sender, consignee, and carrier
- (c) The place and the date of taking over of the goods and the place designated for delivery
- (d) The description in common use of the nature of the goods and the method of packing, and, in the case of dangerous goods, their generally recognized description
- (e) The number of packages and their special marks and numbers
- (f) The gross weight of the goods or their quantity otherwise expressed
- (g) Charges relating to the carriage (carriage charges, supplementary charges, customs duties and other charges incurred from the making of the contract to the time of delivery)
- (h) The requisite instructions for Customs and other formalities.

http://www.eu-gate.eu/system/files/ppmo_attachments/17102017%20SC1_UN_CEFAC Project_en.pdf

11. Do you express interest to participate in primary legislation review?

YES <input type="checkbox"/>	NO <input type="checkbox"/>
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Comments on Question 11 (if necessary):

12. What are the areas for which cross-border e-CMR implementation is important?

Yes

Import/Export Customs Declaration and/or Border control	<input type="checkbox"/>	Specify:
Electronic Invoicing	<input type="checkbox"/>	Specify:
Public Procurement	<input type="checkbox"/>	Specify:
Digital supply chain	<input type="checkbox"/>	Specify:
Digital proof-of-delivery	<input type="checkbox"/>	Specify:
Other regulatory Trade facilitation	<input type="checkbox"/>	Specify:
National Data Harmonization	<input type="checkbox"/>	Specify:
Cross-border Data Exchange	<input type="checkbox"/>	Specify:
Single Window	<input type="checkbox"/>	Specify:
Other	<input type="checkbox"/>	Specify:

Comments on Question 12 (if necessary):

13. Please, feel free to raise any issue that has not been addressed in this questionnaire and that is considered worthwhile to raise:

EXPLANATORY NOTES

WHAT IS THIS QUESTIONNAIRE BACKGROUND?

DIGINNO is a project under Interreg Baltic Sea Region, implemented under “digitalization” umbrella, led by the Ministry of Economic Affairs and Communications of Estonia. The overall goal of DIGINNO project is to advance the digital economy and to accelerate the process of moving towards the Baltic Sea Region single digital market.

The questionnaire is related to particular show-case of the project “Cross-border e-CMR - Paperless consignment notes in road transport, recognized by responsible institutions and used by businesses”. The questionnaire is being sent to Project Partner countries: Estonia, Latvia, Lithuania, Poland, Denmark, Norway.

Summary of the responses to the questionnaire can be found here: <https://www.diginno.sr.eu/wp-3-g2b-cross-border-services>

WHO SHOULD RESPOND TO THE QUESTIONNAIRE?

The self-assessment report (including answers to this questionnaire) should represent a whole-of-government view, and not solely the Ministry of Transport perspective. Thus, substantial cross-ministerial cooperation and coordination is likely to be required. In some countries, officials from the Transport Ministry are best placed to coordinate the different inputs from Economy, Cooperation, Regional development ministries, Telecommunications, *etc.*

Because of this diversity, despite our best efforts to send this information to the right people in your country, we are bound to have made mistakes along the way. If you are not the right person, we would be extremely grateful if you could pass on this questionnaire to the best person in your country to coordinate the response.

WHEN IS IT DUE?

You should send your response to aurelija.burinskiene@gmail.com and ruta@infobalt.lt by **15 July 2019**. This will ensure that your response is included in Study report and is widely available for others to read and be discussed next Project Phases. Your response, in its English language, will also be posted on the dedicated Study publication available in Project website for better transparency and wider viewing. If you do not meet the deadline, your response won't be included in the analysis of the joint report to be presented and discussed during Project review. Summarized information will be posted on a dedicated website which will contain general review of answers to questionnaire.

WHO CAN HELP ME?

There are several technical events being scheduled at the regional level between June 2019 and July 2019 to support this process. If you need further assistance, please feel free to contact.

The additional terms used are defined in the CEF Definitions section on the CEF Digital Single Web Portal: <https://ec.europa.eu/cefdigital/wiki/display/CEFDIGITAL/CEF+Definitions>

GLOSSARY

Cross-border e-CMR	Electronic consignment note of the Convention on the Contract for the International Carriage of Goods by Road facilitates electronic freight documents transfer for road transport.
eIDAS	Electronic IDentification, Authentication and trust Services is an EU regulation on / a set of standards for electronic identification and trust services for electronic transactions in the European Single Market. eIDAS provides a predictable regulatory environment to enable secure and seamless electronic interactions between businesses, citizens and public authorities.
e-Signature	An electronic signature, or e-signature, refers to data in electronic form, which is logically associated with other data in electronic form and which is used by the signatory to sign. This type of signature provides the same legal standing as a handwritten signature as long as it adheres to the requirements of the specific regulation it was created under (e.g., eIDAS in the European Union).
Impact Analysis Framework	The parts correspond to how an approach is used to accomplish impact analysis, how an approach does impact analysis internally, and the effectiveness of the impact analysis approach.
Import/ Export Declaration Party	Documents by which consignments of goods are declared for either export or import Customs clearance. The term “party” refers to a state that gives its explicit consent to be bound by the treaty. This explicit consent is generally in the form of ratification or accession.
Ratification	Ratification defines the international act whereby a state indicates its consent to be bound to a treaty if the parties intended to show their consent by such an act. The institution of ratification grants states the necessary timeframe to seek the required approval for the treaty on the domestic level and to enact the necessary legislation to give domestic effect to that treaty.
Signature	The signature is subject to ratification, acceptance or approval, the signature does not establish the consent to be bound. However, it is a means of authentication and expresses the willingness of the signatory state to continue the treaty-making process.
Single Window	A Single Window is defined as a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single-entry point to fulfil all import, export, and transit-related regulatory requirements. If information is electronic, then individual data elements should only be submitted once.
Standard	A set of rules, conditions or requirements concerning operations; delineation of procedures; describing systems, services or practices is called technical standard. We used the term "standard" to grew out of a need for uniformity in various areas of economic activity.

G. DigInno Project and workpackage 3

A digital **Flagship of Policy Area Innovation**, project DIGINNO (Digital Innovation Network), was launched on 5 September in Tallinn. DIGINNO's objective is to advance the digital economy and to speed up the process of moving towards the Baltic Sea region single digital market. The project aims to increase the capacity of policymakers, industry associations and industrial SMEs to enable faster and more efficient uptake of digital solutions both in public and private sector.

The project focuses on the following common challenges in the Baltic Sea Region:

- uptake of ICT in the business sector,
- innovation and interoperability of public services and
- cooperation and coordination of digital policies on macro-regional level.

These challenges can be tackled through strengthening the macro-regional knowledge base (e.g benchmarking, information sharing, studies), exchange of experience and peer-to-peer learning, designing and piloting transnational digital solutions and conducting policy and regulatory dialog.

The project aims to increase the capacity of policymakers, industry associations and industrial SMEs to enable faster and more efficient uptake of digital solutions both in public and private sector. Some of these target groups are already involved as project partners, but the project aims to address a lot wider range of organizations by including them into project activities or disseminating project's findings and outputs among them.

Project's main, tangible outputs are:

- An active **cross-sectoral BSR industry digitalization community**. Industry 4.0 national and regional communities and networks have an important role in fostering uptake of digital solutions by industrial SMEs and in prioritizing this topic on policy level as well. The aim of industry 4.0 community is to bring together important players from all levels (businesses, associations, universities, public authorities) and sectors (ICT, steel, forestry, etc.) to better understand each-others challenges and find common solutions.
- **Company digitalization toolkit for SMEs**. The aim of developing Industry 4.0 toolkit is to increase innovation capacity of industrial SMEs by showcasing digitalization opportunities and benefits and providing a practical toolkit to guide them through the process.
- **Show-case models of government to business cross-border e-services** (incl. feasibility analyses and proofs of concept) with recommendations for policy makers for developing better cross-border G2B services.
- **Policy recommendations White Paper. The work of the BSR policy network** will be concluded in a White Paper with policy recommendations for national and EU level. The aim is to inform policymakers and increase awareness among decision makers, ensure commitments from external stakeholders and to ensure long term sustainability of project results.

The DIGINNO project falls under the Policy Area Innovation (PA INNO) in the EUSBSR and contributes to its implementation. Digitalization is one of the cross-cutting themes and innovation enablers in the PA INNO, a crucial aspect of accelerating innovation. Five key priorities for macro-regional digital collaboration has been identified in [the PA INNO Strategy Guide](#).

The process behind the PA INNO Strategy Guide and the outcome of the policy analysis has provided direct inspiration for DIGINNO. DIGINNO is part of the implementation of the PA INNO Strategy Guide: it is **one of the sub-projects of digital flagship "BSR Digi co-lab: Transnational Digital Collaboration in the BSR"**



More information about DIGINNO project and about the objectives of EUSBSR Policy Area Innovation on the [PA Innovation website](#).

WORKPACKAGE 3

WP3: Digitalization of cross-border government to business (G2B) public services²⁶

The aim of this work package is to increase the capacity and raise awareness of public institutions, organizations and businesses in developing G2B digital cross-border (CB) services, promote transnational collaboration by building G2B services digitalization network and community, raising knowledge and awareness of success cases, developed show-cases, opportunities and benefits.

The main output for WP3:

- Four (4) show-case models of G2B cross-border e-services (incl. feasibility analyses and proofs of concept)

The show-case models are practical tools for G2B services development, helping relevant public institutions to realise the opportunities of digitalization and understand its possible benefits.

DIGINNO project partners have chosen to focus on the following topics to develop further:

- **show-case A. cross-border eCMR** - Paperless consignment notes in road transport, recognized by responsible institutions and used by businesses
- **show case B. cross-border online business registration** with Integrated eIDAS Framework
- **show-case C. KYC** - Cross border remote Know-Your-Customer processes with eIDAS application
- **show-case d. Real-time-economy** – Cross-border eReceipt application

As a result, the capacity of public sector organisations and industry associations will be increased by selecting priority G2B cross border services, analysing the needs of businesses, sharing the knowledge about development of G2B services in BSR countries through joint development of show cases. The capacity of policy makers dealing with development G2B services will rise by exchange of experience and best practice, policy coordination, discussing and developing common positions.

Ministry of Economic Affairs and Communications of Estonia

Foundation Tallinn Science Park Tehnopol

DIMECC Ltd.

Polish Chamber of Commerce of Electronics and Telecommunications

Latvian Information and Communications Technology Association LIKTA

Ministry of Environmental Protection and Regional Development

Aalborg University

Ministry of Economy of the Republic of Lithuania

The Ministry of Transport and Communications of the Republic of Lithuania

The Brønnøysund Register Centre

Single Window Initiative Estonia and its core members as stakeholders

²⁶ <https://www.diginnoobsr.eu/wp-3-g2b-cross-border-services>